The College of Engineering in the First Hundred Years of The Ohio State University

by J. Merrill Weed

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THE COLLEGE OF ENGINEERING IN THE FIRST HUNDRED YEARS OF THE OHIO STATE UNIVERSITY

I. The First Quarter Century

Though there was no formally organized College of Engineering during the first quarter century of The Ohio State University, engineering was very much in evidence in the purposes, the name, the curriculum, and the students and graduates of the growing institution. The Morrill Act of 1862, granting land to endow these colleges in the various states, specified instruction in agriculture and the mechanic arts. The nature of the instruction intended was set forth in the name given the institution by the act passed the 22nd of March, 1870: "That a college, to be styled the Ohio Agricultural and Mechanical College, is hereby established."

In The Age of Discontinuity (Harper and Row, 1969), Peter F. Drucker, the interpreter of management science, praises the Morrill Act as a prime factor in creating today's material abundance. With particular reference to agriculture, but with application to technology as well, he writes:

> ....What was new was the idea of converting farming altogether from a practice into a discipline...This is a greater change in culture, society, and economy than most of the technological innovations we marvel at.

Drucker's observation has the advantage of more than a century of hindsight. With remarkable prescience, however, similar sentiments were expressed at the time Ohio was considering whether to accept the land grant and establish the institution of higher learning it would endow. Some of those examples of shrewd insight are quoted in the first annual report of the Board of Trustees of what was to become The Ohio State University. This report, prepared by the Board's eloquent secretary, Joseph Sullivant, covers events

in the college history through the year 1871, when the institution had been located and the main building was under construction but classes were more than a year in the future. It was submitted to the Governor of Ohio the 27th of February, 1872.

Sullivant quoted from the "Memorial of the State Board of Agriculture in Favor of Accepting the Lands Granted by Congress 'In Aid of Instruction in Agriculture and the Mechanic Arts,' and in Favor of the Speedy Establishment of an Agricultural College." This memorial, adopted unanimously by the Board of Agriculture the 8th day of January, 1864, contained these observations:

> Many of the natural sciences are found to have such intimate relations to agriculture and the mechanic arts, that to insure the highest success, these branches of knowledge must be understood and applied. Capital or labor employed in ignorance and consequent disregard of nature's laws is thrown away; the loss is sustained not only by the individual, but there is a corresponding loss to the State....

At that time the Nation was fighting for its life in the Civil War. Nevertheless, there was appreciation of the future. The Ohio General Assembly the 9th of February, 1864, accepted the land grant.

There was actually too much optimism as regards finances. The idea was widely held that the 630,000 acres of the grant would bring in a large sum, and many localities and struggling colleges tried to get a share of it. Some favored distributing the endowment among several places.

Ohio Governor John Brough, in a message early in 1865, pointed out that if the income were divided up little could be accomplished:

> ...I trust you will not, under the pressure, or in the conciliation of local influences, so weaken or impair the fund as to render it comparatively valueless...It is evident that the intention of the enactment is to institute a new and distinct species of education; one not heretofore favored or specially encouraged...The purpose to be accomplished is the application of that instruction to the advancement of the agricultural and mechanic interests of the country...

On the 13th of April, 1865 (the day before President Lincoln was shot), the Legislature passed a law authorizing five commissioners to decide where to put the "college or colleges" and report before the end of the year. The make-up of the five commissioners was to reflect the intentions of the Morrill Act:

> ...Two of whom shall be selected so as to represent the agricultural, and two representing the mechanical and manufacturing interests of the State...One of the said commissioners shall be selected with reference to his military knowledge.

Ohio's industrial pattern influenced the report of the commissioners. They recommended "the acceptance of the proposition from Miami University" because "The great manufacturing city of Cincinnati is sufficiently near to admit of an occasional excursion to explore her busy shops and ponderous machinery."

Despite this recommendation, the jockeying continued. Finally, the 22nd of March, 1870, the Legislature established the college and decreed that the Trustees should select the location before the 15th of the following October. Just getting under the wire, on the 13th of October, the Trustees decided on the Neil farm north of Columbus.

Secretary Sullivant concluded his historical account in that first report of the Board of Trustees with a description of the building which was under construction and to be completed in 1872. Regarding the purpose of the college, he quoted from an address on the Sheffield Scientific School of Yale:

> ...To give the best attainable education in the country to young men who wish to become farmers, acquainted with the elements of the soil and the laws of animal and vegetable life; or workers in metals of any kind; or assayers; or civil engineers constructing railways, bridges, aqueducts, and public works in general; or mechanical engineers with reference to the superintendence of manufactories, the invention and construction of machinery, the application of steam, etc.; or chemists for agricultural, manufacturing and commercial purposes; or mining engineers with reference to the development of mineral wealth, the superintendence of mines, etc.; or naturalists in the direction of zoology, botany, mineralogy, or geology.

As often happens with a public work, even now, the college building was

not ready on schedule. Mr. Sullivant's summary of the second annual report, covering the year ending the 4th of January, 1873, admitted that the building contract had not been enforced, but declared that "the Board will use diligence and all the means in their power to have it completed and furnished the coming season, and they confidently expect to be able to open the college for the reception of students in the autumn of 1873."

The Board had resolved to establish ten professorships, four of which pertained directly to engineering. They were:

> Physics and Mechanics, including in these terms a wide field embracing those branches generally termed natural philosophy, with an explanation of the principles and their application to the uses and industrial pursuits of the many men engaged therein.
>
> Mathematics and Civil Engineering, to enable our pupils to survey their own lands, lay out roads, take levels for ditches, embankments, and underdrains, construct bridges, etc., and in short to fit them for the several avocations in life for which a knowledge acquired in this department is indispensable.
>
> General and Applied Chemistry, by which those of our pupils intending to pursue farming will be enabled to analyze their soils, the grains and crops they grow, the rocks, coals, or minerals on their premises, and determine the value of peat, marl, animal, mineral, or vegetable manures,and their adaptability to their own purposes; and to qualify others for useful and prominent positions in the numerous and varied pursuits of practical life which depend upon a knowledge of this important science.
>
> Geology, Mining, and Metallurgy, which are so greatly to contribute to the development, utilization and economy of our vast mineral resources, and in the future to add so much to the wealth and prosperity of our own state.

Besides these four departments, which are largely engineering in nature, the Board of Trustees planned professorships in six subjects which, indirectly, at least, touch the lives of all people, including engineers: Agriculture, Veterinary Science, Botany and Vegetable anatomy and physiology, English and other modern languages, Ancient languages and Political Economy and Civil Polity. In addition, according to Sullivant, "Provision will also be made for teaching military tactics."

Breadth of vision and enthusiasm (aswell,perhaps, as his own ideas) color Mr. Sullivant 's statements about the attitude of the Board of Trustees:

> The manner in which things are taught will be as important as what is taught, whether it be a little of languages, or much of agriculture and mechanics... It is a mistaken notion that a narrow and technical education is all that is required in the industrial pursuits of men...The Board of Trustees...do not desire to educate those confided to them simply as Farmers or Mechanics, but as men, fitted by education and attainments for the greatest usefulness and highest duties of citizenship...
>
> Not until the liberal is added to the practical in education will those great departments of human industry, Agriculture and the Mechanic Arts, the creators of wealth in all countries, attain to that elevated social position they are so justly entitled to occupy. And to this end, the Trustees of the Ohio Agricultural and Mechanical College will direct their best efforts.

Though the Trustees wanted to start with ten professorships, they cut the educational garment according to the cloth at hand. The resources of the college were limited. The Committee on Faculty advised:

> The question of filling any number of departments of instruction...should depend upon our ability to maintain them. Prudence requires that we should not undertake too much at first, or run any risk of pecuniary embarrassments.

Accordingly,when the College opened, the 17th of September, 1873, only seven professors were on hand. Their varied duties show their versatility as well as the need for them to double in brass. Four of the seven would give instruction in subjects related to engineering:

> Edward Orton, president, and professor of geology, mining, metallurgy, and mineralogy
> Thomas Corwin Mendenhall, professor of physics and mechanics
> Sidney A. Norton, professor of chemistry
> Robert W. McFarland, professor of mathematics, astronomy, and engineering

The other three were Norton S. Townshend, professor of agriculture; Joseph Millikin, professor of English and modern languages; and John H. Wright, assistant professor of ancient languages.

In the words of the report, "Military tactics are also taught." The faculty member who gave military instruction was one with many other duties, Professor McFarland. "Engineering" in his teaching assignment meant civil engineering, but that appears to be in the original sense of technology as applied to civilian pursuits rather than to the military. Considering the diverse tasks that were piled upon him, Professor McFarland qualifies as the Poohbah of the faculty. Whatever of an engineering character was to be done, he did it, and other chores as well. During several of his twelve years on the faculty he was called on to act as bursar, collecting the students' fees, and for that duty he was paid $8.33 per term or $25 for the academic year, though later that salary was doubled. McFarland was appointed superintendent of the college grounds, with authority to engage a man, at not over $35 a month, to act as lawn keeper under his direction. He was called on to survey line fences. Several members of the faculty lived on the campus; one was McFarland, so he was always handy. In his report for 1878 he gave this account of the way his duties kept him busy:

> ...Daily recitations were usually four of one hour each; also one to two hours a day to oversee and manage the field work and papers growing out of such work, or for instruction in drawing. Almost always there is someone who needs extra aid to bring him up to proper standard or to keep him there; and if good fortune smiles a little and no further aid is needed, generally two or three more are ready to take his place. Half an hour a day at least is required for this work...All the time from eight in the morning till five in the afternoon is given up to the work of the College; also about half the Saturdays and many evenings. No recitation has been lost or any other duty omitted within the year or at any time since the college opened in 1873.

Considering the way work was piled upon him, perhaps it is no wonder that in the summer of 1885 Professor McFarland left Ohio State to become the president of Miami University. Hard work, however, did not shorten his life. He had reached the ripe old age of eighty-five at the time of his death in 1910. His last seven years, Dr. McFarland was back on the Ohio State faculty roll as emeritus professor of civil engineering.

In his inaugural address delivered in the chamber of the Ohio Senate the 8th of January, 1874, President Orton showed that his idea of the mission of the college, "to be specially connected with the industrial education of the State," clearly included technology:

> In the first place the education to be furnished is Industrial Education...The civil engineer, the mechanical or the mining engineer, the architect, for any large measure of success in his calling, must secure scarcely less general and special training than the student of law or medicine is obliged to attain...
>
> In the second place, the education to be furnished must be practical...A practical education is an education that can be applied to the necessities and demands of everyday life -- that can be used in the ordinary work of the world...Geometry and its subordinate branches, trigonometry, surveying, engineering, are practical studies. We depend upon them in establishing metes and bounds, in the construction of roads and aqueducts. To lose them would be to relapse into barbarism.
>
> Chemistry has practical applications without number...The manufacture of iron and steel, of glass and soap and paint, are all chemical processes, and for attaining the best results in any or all of these processes, a knowledge of chemistry is indispensable. Geology has a practical side. We follow by its teachings veins of ore or seams of coal. Even astronomy comes down from its station in the sky to the practical work of guiding commerce to its destined haven. The science of mechanics is a practical science. The architect and engineer must learn and obey its immutable laws before their work can stand approved.
>
> In the third place, the education to be furnished by this institution must, according to the terms of its charter, be a liberal education...What, then, is a liberal education?...It is an education that embraces the study of this world of matter, physical science, and the study of man -- his languages, his literature, his history, his art, his relations to his fellow men and to his Maker. The day has gone by when a man shall be called liberally educated for knowing a little Latin and less Greek, while as ignorant of modern science, with its profound influence on human thought and action, as a Rip Van Winkle just awakened from the sleep of a century.

During that first academic year, 1873-74, the faculty of the Ohio Agricultural and Mechanical College developed ideas of the mission of the school and the methods of procedure. In the two-way fashion of education, the faculty members were learning from the students. In meeting the 20th of September, 1873,

the faculty agreed that etiquette in recitations would be left to the decision of the professors. At that time there was some discussion of a permanent program. By the time of the meeting of the 29th of May, 1874, the faculty was ready to adopt a program of instruction and to specify the degrees:

> I. That the Institution confer the degrees of Bachelor of Arts, Bachelor of Science, and Civil Engineer upon those who have gone through the required courses of study as hereinafter detailed.
>
> II. That two preliminary years be required of all persons studying with reference to each of the degrees...
>
> III. That the several Departments of the College be grouped into three schools:
>
> 1. The School of the Exact Sciences, including mathematics, engineering, physics, and chemistry
>
> 2. The School of Natural History
>
> 3. The School of Languages
>
> IV. That each Department organize a two-year course of study, with daily recitations or lectures.

When the second year opened, in September 1874, two additions had been made to the subjects of instruction. One was zoology and comparative anatomy; the other was free-hand and mechanical drawing.

Attendance was still low; there were 59 students that second fall. (In the fall of 1873 only 27 were enrolled.) Nevertheless, President Orton stoutly defended the entrance examinations:

> To open the doors of a college or university to crude and undisciplined youths, too ignorant often to appreciate their ignorance, and to invest them with the rights and prerogatives of college students, seems to me unnecessary, inexpedient,and indefensible...Our examinations are real, but not severe...We require for admission just as little as can be safely asked.

President Orton described the title of the school, The Ohio Agricultural and Mechanical College, as somewhat of a misnomer and a temporary hindrance to its success. He called the college "a scientific school, liberal in its character and practical in its aims," and added:

> I should eagerly welcome additions to our present courses that would increase our capabilities for practical service; for I am sure that it is to our facilities for giving a thorough and practical scientific training that we must look for our largest usefulness and our largest favor with the public.

Professor Mendenhall, in his report in the fall of 1875, told of the usefulness of his students' experiments. He recommended that the experimental telegraph line be extended to downtown Columbus to summon aid in case of fire. The city waterworks had cooperated by allowing the students in mechanics to make pumping tests and so acquire "a practical knowledge of the mode of testing large engines." Professor McFarland, reporting on the field work of his students, declared that a number of them could "readily and accurately execute almost any kind of work in ordinary engineering." The course in drawing in 1875 included "photography from nature and photographic printing."

Though the professors' reports complained somewhat of inadequate equipment, the information circular sounded optimistic. In "Practical Mechanics," for instance:

> ...Instruction will be furnished in the principles and uses of machinery, and also in its construction, and in mechanical drawing. Attention is invited to the great advantages offered in this department of study by the varied and extensive applications of machinery to be found in the city of Columbus. Access to the leading shops and factories is secured for students of the College, and in several establishments facilities for conducting practical experiments have been generously put at the disposal of members of the Faculty. The value of such opportunities to the classes in mechanical engineering can not well be overrated.

Facilities of the department of chemistry were claimed to possess "every thing requisite for the most thorough examination of coals, ores, clays,cements, limestones, and soils, and also for gas and water analyses." Analyses in the department of geology had "brought to light many facts of great importance in regard to the mineral resources of Ohio!" The department of mathematics, astronomy, surveying and engineering was said to have "the best facilities for teaching these branches," and "nothing is lacking that is necessary for the training of the student in the most skillful and accurate ways of executing work."

During the second year of operation of the college, the Board of Trustees had subsidized an engineering work to close the two-mile gap between the campus and downtown. A $3,000 grant was made to the Columbus Street Railway Company to build and operate a street car line on Neil Avenue from west Goodale Street to the south edge of the college grounds. The fare was not to be more than seven cents per passenger, or tickets at five for 25 cents, or 24 for one dollar, or 125 for five dollars, and car speeds must not exceed six miles per hour. Between sunrise and sunset there was to be a car at least every half hour, and at least one car after sunset.

This subsidy appears to have failed to attain the desired results. The street car company was accused of neglecting to provide enough "clean and commodious cars and horses," and of curtailing the schedule, to the embarrassment of college operations. Accordingly, in June,1876, the Trustees appropriated $3,000 for the secretary to procure three suitable cars, with necessary horses, and take over unless the company made suitable improvements within a month.

In the fall of 1876, Luigi Lomia, first lieutenant of artillery, was assigned to the staff as professor of military science and tactics. He relieved overworked Professor McFarland not only of military instruction, but also of some teaching, as adjunct professor of mathematics. The Trustees had apprppriated $125 "to be expended under the direction of Professor Mendenhall" for the experimental telegraph line, and it had been connected with the city fire alarm system and to the downtown Western Union office, "to the great convenience of professors and students."

Professor McFarland, at the meeting the 27th of July, 1876, was asked to survey the run through the college grounds "with a view to the shortening and improvement thereof," and make an estimate of cost and other suggestions. President Orton in his report spoke of McFarland's load: "The subjects of mathematics and civil engineering obviously transcend any one man's limits of time and strength."

In May, 1877, the Ohio Legislature required the College to establish a department of Mines, Mine Engineering, and Metallurgy, and appropriated $4,500 for equipment. There was no appropriation for the additional faculty member, so the professor of Political Economy and Civil Polity was fired. In the fall of 1877 the Faculty adopted the "scheme" for the special degrees of Civil Engineer and Mining Engineer.

President Orton, in his 1877 report,declared that the new department certainly deserved a place, but its students first must study chemistry, physics, geology , and mathematics:

> It is right, therefore, that provision should first be made for these and similar subjects, which make the common foundation for the application of science to practical life, but among these applications, none, except Agriculture, which is already provided for, deserves more prompt recognition than the subject of mining engineering...By the addition of this one chair to the College resources, all the facilities of a well-equipped mining school are now offered to the young men of the State...
>
> Two students...who design fitting themselves for mining engineers, spent two months of the last summer vacation in the coal mines of Steubenville, acquiring there, by practical experience with pick and drill, a familiarity with underground work which books alone can not give...I believe that some such experience should be required of all who seek for the degrees of the institution in these fields of practical activity.

During the year 1876 the U. S. standard weights and measures were brought from the capitol building and set up in a room in the physics laboratory. That was the beginning of another duty for the professor of physics: being official sealer of weights and measures for the State of Ohio. The students of physics and mechanics continued their practical work tending toward mechanical engineering by making tests with "results of permanent value" at the Holly Water Works of the city and by doing practical experiments on the heating powers of coals. Work in the department of chemistry included analyses of some Hocking Valley iron ores. Civil engineering students made complete plans and cost estimates for half a mile of railway line. Professor McFarland earnestly requested a solar compass and a zenith telescope.

In the Circular and Catalogue for 1877-78 four degrees were announced: two general, B.A. and B.S., and two special, C.E. and Mining Engineer (M.E). The designation E.M. for Engineer of Mines was adopted later, after some confusion with the designation of the degree of Mechanical Engineer. The college was reported as "connected with the central portion of the city by two street railroads."

Professor John A. Church, Mining Engineer, took his seat in the faculty in December, 1877, ready to get the Mining and Metallurgy Department started in the winter term 1878. By action of the Board of Trustees, Professors Orton, Mendenhall, Norton, and Tuttle (zoology) were authorized to use the buildings and apparatus for a school of science during the summer vacation.

Professor Mendenhall resigned at the end of the academic year, in June 1878, to take a position at the Imperial University in Tokyo. His successor was Stillman W. Robinson, holder of a degree of Civil Engineer from the University of Michigan, who was then professor of mechanical engineering and physics at the Illinois Industrial University, now the University of Illinois.

Another development of 1878 was the change of name of the institution to The Ohio State University. Professor Orton, though he thought the new name an improvement over the old one which was "cumbrous and misleading," had some reservations:

> ...The term <u>university</u> has acquired quite a definite signification, and can be applied, with strict propriety, to institutions of large range and varied faculties only. This institution has not yet attained to university proportions, and calling it a university does not make it one, in all senses of the word. If the Legislature, however, in this change of title, foreshadows its purpose to expand the college into a university worthy of the name, any present incongruities can well enough be borne.

In the fall of 1878 The Ohio State University had only 198 students, against 211 in the fall of 1877. President Orton asserted that there was no real falling off in the attendance of those who were properly qualified. The year before algebra had been dropped as a requirement for entrance, and

now it was restored. As President Orton stated:

> In 1877 an ill-judged experiment was made in lowering requirements for entrance. Under these lower demands about 20 students obtained admission that were in no way properly prepared to do the college work. Most of these students lost their places by failure to sustain examinations as the year went by. The original standard of qualification were fortunately restored.

Low enrollment affected the faculty financially. The Board of Trustees in 1877 made a ten-per cent salary cut, putting the president down to $3,150 per year and professors to $2,250. Not surprisingly, in June 1878, President Orton attempted to resign, but his resignation was not accepted. That year his pay was cut even further, to $2,750, the professors remaining at $2,250. This scale of compensation persisted for years.

In June, 1878, The Ohio State University graduated its first class, five bachelors of science and one bachelor of arts.

President Orton's report on the advent of Prof. S. W. Robinson pointed out the change in emphasis in the department of physics and mechanics:

> ...He held in the Illinois University the position of Professor of Mechanical Engineering and Instructor in Physics. Our professorship covers the same ground, but the subjects are named and have been developed in reverse order, almost the whole equipment and the main force of the department having been given to Physics. I believe that the best interests of the University have been subserved by the course thus far pursued. We have now a Physical Laboratory decidedly superior to any other west of the seaboard. In calling Professor Robinson to fill the vacancy, you have secured the best trained and most successful professor of Mechanical Engineering in the West, and in so doing, you have signified your purpose to give to this side of the department a balanced and proportionate expansion. The result will be that, by moderate appropriations, we shall have two well equipped divisions of this important department. It is necessary to remember, however, that we shall ultimately have full work for two men...A division of these subjects must be effected in order to secure the most successful treatment of each...

Orton was optimistic about the future of the new Department of Mining and Metallurgy:

> ...It is true that the number of students now in it is small, but this results from the fact that the work in this department properly and necessarily comes in the later years of the student's

> college course. A fair proportion of our young men are expecting to enter upon this line of study as soon as they can reach it in due course, and a few have already entered the University expressly to avail themselves of the Mining Engineering Course...

He took a dim view of one of the requirements of the law establishing the new department:

> ...A provision was made for the analysis of all the minerals of the State that should be sent in for this purpose, without expense to the parties sending them...The present Legislature... passed an act requiring "the professor occupying the chair in the chemical and mechanical department" of this institution to furnish, without charge, an analysis of each and every artificial fertilizer offered for sale in the State that shall be sent to him for this purpose...To comply with its obvious intent would require the undivided time of more than one professor...

Another legislative action President Orton did not like was making military drill optional. However, about half the men had elected drill, and "under the stringent regulations adopted by the Board of Trustees to govern the action of students so electing, a vigorous organization is maintained."

The 1878-79 circular on Organization and Equipment claimed that the civil engineering department had "a full set of engineering instruments of the finest construction;" that the department of mining engineering was "well equipped, both for instruction and practical work;" and announced for mechanical engineering that "The University is now able to offer excellent advantages in this important subject. The Russian system of hand-training has been introduced, which insures the imparting of a measure of practical skill, together with theoretical instruction."

Somewhat less optimism, however, appears in the department reports prepared in the fall of 1878. Professor Church told how things were in Mining Engineering and Metallurgy:

> ...No beginning was made until the end of the first term.* Three students entered, but one was induced to abandon the study by the offer of employment in his profession as civil engineer, and instruction was continued with only two in the full course, and one

*December, 1877

> other who entered for a special course in mineralogy...In spite of the fact that I am occupied four and a half hours daily with lectures and other educational work, and five and a half hours during the third term, I have been obliged to give constant attention to analytical work for the State. ...The material already received is more than I can possibly finish during the whole year. Under these circumstances, I respectfully request the Board to appoint an assistant to carry out this work under my supervision...
>
> The work of analysis has not been the only mode in which the laboratory under my charge has served the State. During the winter I was called upon by committees of the Senate and House to report upon the oils sold for illuminating purposes, and also to determine the limits of safety and to supply a proper test to be enforced by law. Examination of the illuminating oils then in the market showed that they were very unsafe, and a law was passed imposing a flash test of 120° Fahrenheit, made according to a method furnished by me...
>
> The department now gives thorough instruction in Mining and Metallurgy on a scale which is not surpassed by any mining school in America...As now organized, the course in Mining Engineering requires four years study, and is conducted by six professors, three of whom teach the general subjects of geology, chemistry, and German, and three others teach civil, mechanical, and mining engineering. Mathematics, drawing, and physics are either incorporated into these courses, or required of the student before entrance.

Professor Robinson, on the job only two months, made his report dated November 2, 1878, a proposed plan of future work:

> Instruction can now be given in most of the branches which qualify the student for the degree of Mechanical Engineer. The only lack is in the Mechanical Laboratory facilities... Why should not instruction in mechanical engineering have its proper aid from a laboratory as well as other branches of education?...The apprenticeship system is a thing of the past, it having been killed by the modern methods of manufacture...
>
> The instruction in mechanic art which, it is believed, should be provided for at this University, by fitting up the Mechanical Laboratory, may be indicated thus: It should extend at least through four terms, or one and a third years, one exercise per day. Two years would be better... The course, as above outlined, indicates that our present pressing need is for machine-tools and power for the further equipment of the mechanical laboratory.

Robinson's report included an estimate of the cost of the equipment needed, a total of $5,375. The title of this section of the report, "Mechanics, or Mechanical Engineering," suggests a groping for a proper designation of the department.

That 1878 annual report described the organization of the University in the three schools and listed the offering of five degrees: Two general, viz. Bachelor of Arts (B.A.), and Bachelor of Science (B.S.); and three special, viz., Civil Engineer (C.E.), Mining Engineer (M.E.), and Mechanical Engineer (Mech. Eng.) Four-year curricula were printed for each of the three special degrees. The course in mechanical engineering was described as intended "for those who desire to prepare themselves either for the profession of Mechanical Engineering, for superintending the construction of machinery, or for managing machinery in manufacturing establishments. In it instruction in Principles is combined with practice..." The course in Mining Engineering was stated to secure "to the student careful instruction, with ample allowance of time, in the three fundamental branches of the art -- mining, preparation of the ore, and its metallurgical treatment." Furthermore, "The Mining Course is made more complete by the opportunities given for the study of Civil Engineering, and the instruction in Metallurgy is supplemented by the department of Mechanical Engineering."

President Orton's commencement address to the first graduating class, the 19th of June, 1878, restated the mission of the University:

> The core and center of this education must be <u>science</u>. This education must be <u>practical</u>. A practical education is one that can be applied to the interests and necessities of every day life, that can be used in doing the work of the world...Nothing is so practical as science...But science may be taught in an unpractical way.
>
> Disuse of manual labor breeds distaste for it, and, as a consequence, the callings that require it are shunned...What is needed is a system that shall give manual training in an educational way, and that can justify its introduction into an educational course on educational grounds...Imperial Russia leads the way in the establishment of a system of hand-training that admits of being taught by the same methods by which chemistry and geometry are taught -- in classes and by system.
>
> Finally, this education must be liberal...Liberal education recognizes the <u>man</u>....

At the 20th of June, 1878, meeting, the Trustees appropriated $500 to pay one of the first graduates, Curtis C. Howard, B.S., for making the required chemical analyses that Professor Church had complained of. Mr. Howard declined the work. This $500 appropriation was used to bring to the campus a young mining engineer who was to become one of the most noted members of the engineering faculty. At the meeting the 6th of November, 1878, the Trustees "resolved that Nat. W. Lord, M.E., be appointed at a salary of $500 per annum to perform such analyses as the laws now require the University to make." He was Nathaniel Wright Lord, a '76 graduate in mining of Columbia.

In November, 1878, the faculty adopted the course leading to the degree of Mechanical Engineer. The style of abbreviation for the new degree was fixed at Mech. Eng. There was for a time some confusion between the abbreviations for Mining Engineer and Mechanical Engineer. In the circular for 1880, "Nat. W. Lord, M.E." appears for Nathaniel W. Lord, Mining Engineer. The circular for 1881 lists him as E.M., the letters standing for Engineer of Mines, the style that was finally adopted for this degree.

At the faculty meeting the 6th of November, 1879, the technical courses were reviewed, and the studies of the freshman year in civil engineering, mining engineering, and mechanical engineering were made to agree with those of the freshman year in the course leading to the Bachelor of Science degree.

Only two years after it was established, the department of Mining Engineering and Metallurgy was cut back because of lack of attendance. At its meeting the 18th of June, 1879, the Board of Trustees resolved:

> WHEREAS, it is no longer deemed expedient by this Board to continue the present status of the Mining and Metallurgical Department whereby a professor and an assistant are employed in doing the work that can be well, and fully done, by one; therefore,
>
> RESOLVED, that the department be placed in charge of an assistant professor for the ensuing year, and that Nat. W. Lord,M.E., be employed as assistant professor, at a salary of $1200 per year...
>
> RESOLVED that the secretary of the Board is hereby in-

> structed to inform Prof. John A. Church that his services are no longer required, and this action is based on economic reasons alone.
>
> RESOLVED, that as a Board, we recognize the able and scholarly services of Prof. John A. Church on behalf of his department since his connection with the University.
>
> ORDERED, that the salary of the assistant professor in the Mining and Metallurgy department of $1200 be paid one half from the endowment fund and the other half from the State appropriation for chemical analyses required by the State law.

At that same meeting, Professor McFarland was continued as bursar at $25 per year.

Modern developments were coming. At the meeting of the 18th of June, 1879, the Trustees gave the executive committee power to act on the question of putting in a telephone and repairing the bathroom in the dormitory.

At their meeting the 16th of June, 1879, the Trustees approved plans for the Mechanical Laboratory. The contract was let to the lowest bidder for $4,550, for a building described in the secretary's summary as:

> ...Composed of stone foundation, brick walls throughout, and covered with slate; the north and west wings are respectively 32 x 77 and 32 x 61 feet, and one story in height, while the connecting corner, which is 34 x 38 feet, is two stories, and is ornamented by three towers. The building was begun July 21, and completed early in November, and proves in all respects well adapted to its object. The general purpose of this building and equipment is not simply to provide instruction in mechanic arts, but to teach the principles necessary in the intelligent designing, superintending, and managing of machinery...

President Orton's report dated the 15th of November 1879 described the previous year as the most successful in the history of the institution. Regarding the Mechanical Laboratory, he declared that "Money has never been more carefully and economically expended on the College grounds than in its erection. ...The lower room is intended for a mechanical museum, or for a depository for machines on exhibition, models, specimens of materials, etc. A collection for it has already begun,and I trust that the great manufacturing State of Ohio will not be long in doing its share toward filling not only this room with exhibits but the other rooms of the building with young men."

He had no misgivings about the University's course in mechanical engineering:

> It is very gratifying to be able to state that the appropriation of the Legislature of last winter has so bountifully increased our facilities for instruction in this subject as to leave us scarcely second to any of the institutions of learning of the country in this respect...

Other needs were pressing. The president reported that "The chemical department needs a building to itself."

Assistant Professor Lord reported in the fall of 1879 that "the present year starts with five students in Mining and Metallurgy; others are arranging their preparatory work."

Sweeping claims about facilities appeared in the catalogue section of that 1879 report: There was "ample provision" in physics, and "full instruction" in chemistry." Drawing had "all needful facilities," and civil engineering "a full set of engineering instruments of the finest construction." Mining Engineering was "well equipped, both for instruction and practical work," and in mechanical engineering "The Russian system of hand-training has been introduced, which insures the imparting of a measure of practical skill, together with theoretical instruction."

Optimism was evident in the report for 1880. Physics and mechanical engineering were to be separated; in September, 1881, Professor Mendenhall would return from Japan to be professor of physics and Professor Robinson would be professor of mechanical engineering. Now that the mechanical laboratory had been completed and equipped there were "a goodly number of young men already pursuing the studies that lead to the degree of Mechanical Engineer... some attracted from other states." Drawing had a new instructor, Assistant Professor William A. Mason, Jr., and the department was "projected upon a broader utilitarian basis." Things "fared much better in the military department" for drill had again been made compulsory.

In the fall of 1880, Professor Robinson had Frederick Marvin as assistant

in mechanics and two student assistants in physics. This was probably Charles Frederick Marvin who was to receive the Mechanical Engineer degree in 1883; it is a noteworthy example of a practice of those early days, of giving able undergraduates considerable responsibility as assistants. Besides the help of the professor of military science, overworked Professor McFarland had a student assistant in mathematics.

At the June 1880 commencement the University granted its first engineering degrees, one in mechanical, one Engineer of Mines. The Mechanical Engineer became a "resident graduate" in the fall of 1880. At them meeting to recommend those degrees, the faculty resolved to take orthography and grammar into account in marking entrance examination papers.

After lying on the table for three years, President Orton's resignation was accepted in 1881, and he stepped down to be merely professor of geology. Walter Q. Scott was the new president. Dr. Mendenhall was back as professor of physics, and Nathaniel W. Lord had been advanced to full professor of mining and metallurgy. First Lieutenant George Rhulen replaced Lieutenant Lomia as professor of military tactics and teacher of some of the mathematics courses.

Professors McFarland and Robinson had planned and carried out an engineering work giving an "adequate and satisfactory water supply for the main building for the first time." The supply from cisterns and wells had been "uncertain and precarious." Now, "by erection of a wind mill, the strong spring to the south side of the college" had been utilized, "and an abundant supply of good water" had been carried to the tanks and cisterns..

To illustrate his lectures on metallurgy, Professor Lord was reported to be preparing slides at his own expense so his room should "be provided with shutters." Besides teaching mining and metallurgy and making the analyses in the state laboratory, Professor Lord had taught 27 students in preparatory English. The professor of history and English explained this assignment: "I taught a class of 80 in Abbot's 'How to Write Clearly' once a week throughout the first and second terms. The division of the class, so necessary to

its success, was made possible by Professor Lord taking a section of it in the spring term."

At commencement in 1881 a Mining Engineer degree was awarded, and three men got certificates of proficiency in civil engineering.

During this period in the history of the University the faculty had had a sort of running battle with the Trustees about holding daily chapel exercises. A reprieve of sorts was won in January 1881 after Professor Orton had explained that this new kind of education, with its laboratory courses, made an assembly of all students difficult. Later the faculty capitulated and chapel was held. Early in 1881 the Trustees asked the executive committee to "investigate and report on the feasibility of introducing the electric light upon the grounds," possibly substituting it for the gas lights then used.

Lord's promotion to full professor was a "dry raise;" in notifying him the secretary was to make clear "that said advancement does not carry with it any increase of compensation." The arrangement for his pay was "conditional;" at the meeting the 6th of May 1881, the Trustees

> RESOLVED, that Prof. N. W. Lord, for the next year, be employed at a salary of $1,000, for which sum he is required to take charge of the instructions in the department in assaying, metallurgy, and mining, and to do in the State Laboratory such work as shall be submitted to him by the President of the Faculty and is covered by the State law. That he is to have full use of the Laboratory for other work, and the privilege of employing at his expense such assistance as he may desire at the Laboratory. That he will, at his expense, provide all current supplies, except those furnished students in assaying. No Laboratory or other work is to interfere with class instruction or other duties to the University. That all work so taken and done shall be charged for and collected by him. That he retain so much thereof as will make his net salary for the year, together with said one thousand dollars, two thousand dollars, if so much be collected by him, and that all excess over two thousand dollars shall be by him paid over to the University. That he shall maintain the apparatus of the Department and keep the same in good condition.

At the meeting the 22nd of June, 1881, Professor Robinson was instructed to place the Mechanical Laboratory in charge of "F.D. Marvin"

(who may have been Charles Frederick Marvin) during the vacation. The Board of Trustees approved the reports of Professor McFarland as bursar and superintendent of lawn and on the cost of the wind-mill, and re-elected him bursar at the "usual salary of $25."

In the annual report submitted in the fall of 1882, Professor McFarland was listed with a LL.D., a new degree from his alma mater, Ohio Wesleyan. Lieutenant Rhulen was still professor of military science and assistant professor of mathematics. Another service officer had been assigned, Lt. Frank H. Eldridge, assistant engineer of the U.S. Navy, and listed as professor of steam engineering and assistant professor of physics.

The contract for the chemical laboratory was awarded in June, 1882, for $18,750. It was described as "a plain and substantial, but not unsightly building, 42 feet 2 inches wide by 160 feet 2 inches long, not including the central wing, 40 by 40 feet." Ventilating appliances used in laboratory work in chemistry and mining and metallurgy had been introduced into the construction.

Action of the Legislature the 17th of April,1882, created a Meteorological Bureau, and the professor of physics was made its director, ex-officio.

At the faculty meeting the 7th of June, 1882, it was decided that:

> The various departments of the University shall be grouped in four schools, designated as
>
> I. The School of Agriculture...
>
> II. The School of Arts and Philosophy...
>
> III. The School of Engineering, including those studies which enter into the courses leading to the degrees of civil engineer, mechanical engineer, and engineer of mines
>
> IV. The School of Science, including those studies which enter into the course that leads to the degree of bachelor of science

Each school would have a committee, of which the president of the University would be chairman, and faculty members were assigned as members. Professor Lord became the first secretary of the School of Engineering, and other

members were the professors of civil engineering, mechanical engineering, mining, physics, and industrial arts. The committees were to have jurisdiction over the studies of students in their respective schools and in all matters of minor discipline. All students in any school would be either (1) those who intended to take one of the regular courses of study leading to a degree, and (2) those who intended to take some special study or line of work without expectation of receiving a degree. There were to be no unclassified students.

In the fall of 1882 Professor Orton had a two-months leave of absence to prepare a report on economic geology of Ohio. His course in general geology was in charge of hard-working Professor N. W. Lord. Professor Lord reported that fall that he was assisted in his analyses and assay work by Edward Orton, Jr., then a junior in the course in mine engineering.

President Scott in his report submitted in the fall of 1882 explained the reorganization of the University:

> It was ... not a desire to depart from the liberal policy which should always characterize the State University for affording special facilities for particular studies to students having definite aims, but rather a determination to secure the best training in all courses of study, which led the Faculty to organize the various departments of the University into four schools.

Professor McFarland was assigned another chore at the Trustees meeting of the 9th of March, 1882: "To mark out the line of the dividing fence between the campus and the experimental vegetable grounds lying east of the college." One of the Trustees, the secretary, and Professors McFarland and Lazenby (he was professor of botany) made up a committee to "locate the fence marking the boundary line of the campus south of the present wagon entrance to the College from High Street."

No appropriation for heating and installing water had been made for the Chemical Laboratory built in 1882, and it was unused. In 1883 Prof. S. W. Robinson was engaged, at 5% of the cost, to plan and superintend that installation, and the contract was let for $4,703.64. To secure a more reliable water supply

than that pumped from the spring by the wind-mill, the Trustees agreed to pay 25 per cent of the cost to the Columbus Water Works Company for laying pipes from High Street to a plug near the buildings. At the Trustees meeting the 22nd of June, 1883, Professor Mendenhall was "charged with having suitable water pipes in the main building connected with the city water works," as well as locating a water meter and organizing a local fire brigade.

Walter Q. Scott was president only two years, and he was followed by President William H. Scott who, in reporting in the fall of 1883, soon after he took office, praised the faculty for public service:

> By the payment of adequate salaries, the trustees have been able to command the services of professors of eminent ability...The faculty is recognized throughout the State and beyond the State as one of exceptional strength. One of the proofs of this is that the Faculty is so often drawn upon to perform conspicuous services. Professor Orton is the State Geologist, and...has served on the Screen Mining Commission...Professor Mendenhall has been director of the State Meteorological Bureau since it was established, and at the last Cincinnati Exposition was chairman of the Commission on electric lighting. Professor Robinson was recently selected to examine and report on railroad brakes. Professor McFarland, Professor Robinson, and Lieutenant Rhulen spend much of their vacations in the inspection of the railroads of the State...Facts like these are the strongest commendation.

When Professor Mason of drawing left in the summer of 1883, the Trustees chose Charles F. Marvin, one of the four recipients of mechanical engineering degrees at the June, 1883, commencement, to teach projection drawing. He taught both mechanical drawing and mechanics, but his teaching career was short; he left Ohio State the following year to become a junior professor of mathematics inthe U. S. Signal Corps, and later he served as chief of the United States Weather Bureau. Two other M. E. graduates in '83 became distinguished teachers: William Frederick Speer and Joseph Nelson Bradford. In June, 1883, the University graduated its first Civil Engineer.

President Scott's report in the fall of 1883 deplored the fact that

the University had no astronomical observatory. The president stated that there had been applications for instruction in architecture and that department was needed, as well as a course in sanitary engineering. Further:

> The need for enlargement is nowhere more imperative than in the department of mathematics and civil engineering. These sciences are extending year by year. New methods are being devised, new instruments are being invented, and new lines of investigation are being developed...As may be supposed, the professor is sadly overworked. We have, in fact, three departments in this one -- pure mathematics, civil engineering, and astronomy, which in other schools that rank with ours are kept distinct.

Lieutenant Eldridge reported that by arrangement with Professor Robinson a class in steam engineering had been put in the mechanical engineering course, with study of fuels, combustion, and properties of steam.

Employees during 1883-84 included C. F. Marvin as assistant in mechanics at $500 and C. N. Brown as assistant in mathematics at $600. Mr. Brown would later head civil engineering and be the second dean of the College of Engineering.

The Trustees were not about to squander money. At the meeting of the 15th of November, 1882, Professor Mendenhall was given leave of absence to deliver a course of six lectures at the Lowell Institute in Boston,"with salary to cease during his absence from the University." At their meeting the 18th of June, 1883, the Trustees granted Professor Orton leave of absence without pay for two months as a member of a mining commission. Action at the meeting the 22nd of June, 1883, permitted the contractors working on the new laboratory building to remove the telephone to the laboratory during the vacation on condition that they return it at the beginning of the next college session at their own expense.

Professor Mendenhall had complained about the telephone in faculty meeting the 2nd of February, 1883. He wanted it "removed "to some other room where its demands could be attended to by a person specially employed for that purpose." He was authorized to move it and supply "some person at a salary not exceeding

$10.00 per month to attend it." The faculty also decided that "each student using the telephone be assessed five cents for each message to cover said salary," with that "any deficit in the amount to be made up by assessment upon the professors in amounts proportionate to their private use." This scheme must not have worked out, for the faculty meeting the 6th of March, 1883, appointed a committee to devise a schedule for the proper working of the telephone arrangements. Again, in the faculty meeting the 17th of October, 1883, "the telephone service for the University was considered at length, but no action taken." In meeting the 15th of November, 1883, the faculty adopted "Standard" time for the University routine.

Meeting the 23rd of March, 1885, the faculty refused the request of the literary societies to serve refreshments at their reunion, stating that the "Faculty do not consent to use of college buildings for social purposes." At various meetings the faculty had turned thumbs down on dancing in the buildings and expressed its animus at secret fraternities, but had come out in favor of baseball so long as it was kept within proper limits.

The faculty meeting of the 16th of June, 1884, recommended one candidate for the degree of Mech. Eng., and two for Mining Engineer--one of them Edward Orton, Jr., son of the professor of geology and former president.

Catalogues of the University in the mid-eighties showed the many duties of Professor Lord. He was chemist of the Ohio Geological Survey and chemist of the Ohio Agricultural Experiment Station, which had been established in 1882. Professor Orton was listed as State Geologist. The professor of physics had multiple listings as director of the Meteorological Bureau and State Sealer of Weights and Measures.

After the fall term 1884, Professor Mendenhall left his post as professor of physics and holder of the ex-officio jobs to become professor of electrical science in the office of the U. S. Chief Signal Officer. His assistant, J.P.Randall, with E. H. Mark of the Meteorological Bureau, carried on the rest of that academic year, with Mendenhall "giving by letters from Washington,

valuable counsel in laying out the work." Dr. Benjamin F. Thomas, the new professor of physics, took his seat with the faculty at the meeting on the 16th of September, 1885.

Another member of the first faculty departed at the end of the 1884-85 academic year. Professor McFarland resigned to become president of Miami University. The Ohio State faculty, at its meeting the 23rd of June, 1885, adopted a resolution of regret at his leaving to "return to his old field of labor and to assume control of the Miami University," and further

> RESOLVED: That while we should be happy to have him remain longer in this portion of the educational vineyard, we wish him God speed in his departure from us and hope for him and the Miami University that portion of success which his zeal and energy are sure to merit.

President Scott's report in the fall of 1885 spoke of the departed Professor McFarland as "an active and able man, whose broad kindliness, devotion to the University, and sympathy with the personal interests of the students had made him a general favorite." The creation of a distinct department of civil engineering had "added materially to the strength and efficiency of the instruction."

Professor McFarland had groomed his successor in civil engineering. He was Christopher Newton Brown, who had studied at Ohio State the three years, 1876-79, and then/had left to do practical work in railroad location. Mr. in his senior year Brown had returned to the University in 1883 as assistant in mathematics and civil engineering, and after two years in that subordinate teaching position he was appointed assistant professor in charge of the civil engineering department. With the appointment of George Comstock as professor of mathematics, civil engineering became a separate department. The new professors "sat with the faculty for the first time" at the meeting of the 16th of September, 1885. Comstock and Thomas were assigned to the committees of the School of Science and the School of Engineering.

C. Newton Brown was listed in the 1886-87 catalogue as associate professor of civil engineering. In 1886 his lack of an academic degree was made up; Miami University, where his mentor, Dr. McFarland, was president, granted him his C. E.

Professor Robinson, in his report dated the 4th of November, 1884, mentioned the able assistance of C. F Marvin, who had been his assistant and who had left for the U.S. Signal service. Considerable able assistance came from undergraduates. In meeting the 14th of November, 1883, the Trustees authorized employment of C. F. Scott as assistant in the physics laboratory at $100 for the year. Charles Felton Scott, an arts graduate in 1885 and son of President William H. Scott, later became an engineering professor at Yale.

Secretary Cope's report of the Board of Trustees for the year 1885, transmitted the 17th of November, 1885, included George C. Comstock as professor of mathematics and astronomy, C. Newton Brown, assistant professor of civil engineering, and A. P. Blocksom for military science and assistant professor of mathematics. Navy Lieutenant Eldridge had left the work in steam engineering in the department of mechanics, and Joseph N. Bradford, M.E.'83, had been elected assistant in mechanics and instructor in mechanical and free-hand drawing.

In the fall term of 1885 there were 313 students -- 272 men and 41 women, and therewas"demand for education beyond the baccalaureate degree."

At the beginning of the academic year 1885-86, Mr.Bradford reported that drawing "after a lapse of two years, had again been established," and he was devoting part of his time to "Professor Robinson's department."

Meeting the 23rd of June, 1885, the Trustees resolved that "Members of the faculty shall not, during term time, leave the University to engage in any other work without the express consent of the president of the faculty, or in cases of prolonged absence, of the Board of Trustees." Since Professor McFarland was no longer available, the secretary was ordered to discharge the duties of "bursar."

During 1885-86 Assistant Professor Brown invited the Ohio Society of Surveyors and Civil Engineers (one of the forerunners of the Ohio Society of Professional Engineers) to deposit its library with the department of civil engineering for use by students, and declared that the collection of books, maps, papers, etc., though not large had proved to be very valuable. An addition to the civil engineering department that year was a blue print room.

In June, 1886, the University graduated 18, of whom eight received degrees in engineering. Recipients of degrees in June 1887 included Frank A. Ray as Engineer of Mines (he was later professor and dean of the College of Engineering), Joseph R. Taylor as B. A. (after first teaching drawing he became a beloved professor of English), and William McPherson, Jr., as bachelor of science--he was to become chairman of the department of chemistry and dean of the Graduate School.

At the close of the academic year 1886-87, Professor Comstock resigned as professor of mathematics and astronomy. His replacement, beginning in the fall of 1887, was Rosser D. Bohannan, holder of the degrees of bachelor of science, civil engineer, and engineer of mines from the University of Virginia, with post-graduate work in England and Germany. Professor Bohannan taught mathematics to many college generations of engineering students.

A special two-year course in mining engineering for those not prepared to take the full course was outlined at faculty meeting the 6th of June, 1888. Degrees granted in June, 1888, included four in civil engineering, four in mechanical engineering, and four as engineer of mines--a dozen out of the total of 28. One of the mechanicals was Benjamin Garver Lamme, later to become a noted electrical engineer. Among the civils were E. A. Kemmler, later a faculty member in civil engineering, and Charles Cutler Sharp for whom the Chemistry Department Library at The Ohio State University was named.

"Applied electricity" or electrical engineering was receiving a great deal of attention in the eighties. In the Board of Trustees 1884 Report, Secretary Cope noted that an Edison dynamo and seven-horsepower gas engine purchased for the department of physics had been set up in the basement of the main building and declared that the "recent wonderful development of electricity as an applied science has made it a subject of unusual interest to the scientific student, and a thorough knowledge of it is of great importance." The first of March 1886 Professor Thomas' assistant, J.E. Randall, resigned "to accept employment with an electric light company."

Professor Thomas, in the physics department report for the fall of 1887, commented:

> You are aware that there is an increaseng demand among our students and from without for work in applied electricity... Electrical engineering is rapidly becoming a profession, and must soon take its place beside mechanical and civil and mining engineering in the work of technical schools... This University ought to supply the demand for Ohio, at least, but we cannot give young men a training which, when put to the test of practical use,will be satisfactory either to themselves or to their employers, until special provision is made...

In the same report, President Scott added his plea:

> The necessity for special equipment in order to give a thorough course in electrical engineering is urgent. The marvelous growth of electricity as an applied science, and its increasing use for lighting and motive power, furnish a strong argument in favor of a course of training in the methods of its application. Such a course is scarcely less important than those in civil, mechanical, and mining engineering, and should be provided at the earliest practicable moment.

Faculty action the 18th of September, 1888, added one year's work in applied electricity as an elective in the junior and senior years of the science curriculum. At the meeting the 10th of April, 1889, the faculty adopted a course in electrical engineering, including studies for the freshman, sophomore, junior, and senior years. Preparatory students over eighteen years old were allowed to pursue special work in electrical engineering.

Board action the 24th of November, 1886, brought to the campus a man who was to be a University official for years, in the capacity of chief engineer (including some lecturing to students on steam boilers) and later as superintendent of buildings and grounds. He was William C. McCracken and his first appointment as "engineer" was at a salary of $66-2/3 per month.

Electrical engineering received an appropriation of $10,000 in 1889, and the annual report transmitted that fall described the spending. The building cost $6,537.25, and $1,418.36 had been used for equipment, with $2,044.39 yet to be spent. Professor Thomas had received donations worth over $6,000 from manufacturers of electrical machinery and appliances. One improvement led to another need; probably the addition of the electrical engineering laboratory would require more steam than the boilers could supply. The laboratory was "a plain, substantial two-story building northwest of and near the west end of the main building."

President Scott in the 1889 report stated:

> At the beginning of the present college year a full course in electrical engineering was offered. It is based on that in mechanical engineering, with such deviations as the specific ends in view require. The difference is mainly substitution of additional study in physics and a year of laboratory work in electrical engineering for some of the more special branches of mechanical engineering...Many students have already entered, and that course will no doubt be as much sought as any the University offers. Our present facilities for instruction in electricity are equaled by few institutions of learning.

In his 1889 departmental report, Professor Thomas made some special claims for the course in electrical engineering as it was set up:

> It will be noticed on comparing the course of study in electrical engineering with that in mechanical engineering that the two are to a great extent parallel. It is now a well recognized fact that a thorough knowledge of mechanical engineering is necessary to the best success in electrical engineering. The degree of Mechanical Engineer is given to graduates in this course because, in view of the above statements, the degree is considered of higher rank and value than that of Electrical Engineer as conferred by other colleges which do not include the work in mechanical engineering.

Mechanical Engineer was the first designation of the degree for work in the course in electrical engineering. Then the degree became, and continued for many years to be Mechanical Engineer in Electrical Engineering.

Practical work in civil engineering, according to the 1889 report, included student preparation, under direction of Professor Brown, of plans and estimates to connect the University buildings to the Columbus trunk sewer.

Fire the 12th of February, 1889, destroyed the chemical laboratory, erected in 1882-3. Classes in chemistry, mining, and metallurgy were transferred to the main building.

Joseph N. Bradford, M.E., who headed the work in drawing reported in October 1889 that the generous offer of J. R. Taylor had relieved crowding in that department. Mr. Taylor taught freehand drawing, which Bradford recommended for at least one hour a week during the winter term of the freshman year in engineering. Inquiries had been made about a course in architecture, and Bradford recommended it:

> An architect, to be proficient, should be a good engineer, as it is indispensably necessary that he should understand construction. We have all that pertains to good engineering well established, leaving not a great deal to be added in order to establish a course in architecture.

By action at the meeting the 24th of June, 1890, the Board of Trustees made drawing a department separate from mechanics with Assistant Professor Bradford in charge. At that same meeting the Board rented a campus house which one of the professors had vacated to Beta Theta Pi fraternity for $475 a year.

Associate Professor Brown was secretary of the standing committee of the School of Engineering in 1889, and members were Professors Robinson, Lord, Thomas, Bohannan, and Associate Professer Eggers who taught German. The catalogue showed that the freshman year was the same for all the engineering courses except electrical. The report on mining and metallurgy stated that

the department's graduates were "making themselves known." The Ohio Legislature had appropriated $3,500 for instruction in practical operation of mines, and Frederick W. Sperr, E.M. '83 had been engaged as assistant professor of mining engineering.

Secretary Cope, in the Trustees report to the Governor the 15th of November, 1890, declared "The University no Longer an Experiment," being "one of the leading educational institutions of the country, exerting a wide and elevating influence."

At the June 1890 meeting of the Trustees, C. N. Brown was advanced to full professor. The theses of the three mechanical engineers who were graduated in June 1890 showed their interest in electricity. Ralph D. Mershon's dissertation was on "Determination of the Permeability of Iron and Its Alloys." Russell Feicht and Charles E. Skinner did a joint thesis on "The Efficiency of the Ohio State University Electrical Plant." R. D. Mershon was assistant inp physics at Ohio State for one year. Then he went into industry, became a highly successful electrical engineer, and at his death bequeathed a fortune to his alma mater.

Professor Thomas, in October 1890, reported on the first year's work in electrical engineering:

> The senior class work consisted of lectures on the theory, design, and use of dynamo-electric machinery and other topics of importance to electrical engineers, together with practical instruction in the electrical engineering laboratory...The class was formed and instruction given at the request of the three seniors in the course in mechanical engineering, there being no seniors in the electrical engineering course...The last named course was opened as a regular course for the first time at the beginning of the year covered by this report. I am unable to state the number of students enrolled in it, as no separate classification of them was made in the college enrollment. The number is, however, greater than I expected the first year. The course has attracted attention from all parts of the country, and is sure to bring us an increased number of students.

About this time one of the attractive features of the campus was temporarily lost. When the Columbus trunk sewer was built, the spring at Mirror

Lake stopped flowing. Professor Sperr of the Mining department was engaged by the city to plan and superintend rebuilding of part of the sewer and the spring was saved.

"Great material prosperity" was reported for the year ending November 15, 1891. Henry Curwen Lord, who had attended Ohio State but had been graduated from the University of Wisconsin, was on the teaching staff in mathematics; his special interest was astronomy, and he later became director of the McMillin Observatory. Henry C. Lord was a brother of Nathaniel W. Lord, and in honor of their respective teaching specialties they became known to a long succession of engineering students as "The Lord of the Heavens and the Lord of the Earth." Mershon's place as assistant in physics had been taken by James E. Boyd, B.Sc. class of 1890, who was to become chairman of the department of Engineering Mechanics and one of the acting deans of the College of Engineering.

In this 1891 report President Scott noted:

> Massing of students in the engineering courses, especially the course in electrical engineering, has created a great pressure on the room, the resources, and the teachers of some of the laboratories and of the department of drawing...

A building for manual training (and to accommodate the department of drawing) was under construction, contract price $51,606; it would be named Hayes Hall in honor of Former President R. B. Hayes who, as a member of the Board of Trustees, was much interested in a course in industrial arts. Also under construction was the geological building, Orton Hall, which would house the University library for a time.

Figures in the 1890-91 annual report show the surge of interest in electrical engineering compared with the unspectacular development of the other technical specialties. Electrical engineering, listed for the first time, had 66 students--four seniors, seven juniors, 17 sophomores, 36 freshmen, and two specials. Next highest was civil engineering, with 58, including 29 freshmen, ten sophomores, and seven in each of the last two years, also five specials. Mechanical engineering enrollment had totaled 44 in 1889-90, but

for 1890-91 it was down to 18. Mining enrolled only ten in 1890-91, but that was still the highest figure for that specialty. Electrical engineering had attracted one of the women students, a sophomore in 1890-91.

In this report the president praised the character and conduct of the students as justifying the freedom they enjoyed:

> They exhibit an unusual sense of responsibility and self-dependence, and it is doubtful whether a system of rigid surveillance would secure as good results.

However, he deplored the fact that

> so much attention is given to extraneous things; not only the ball and tennis clubs, but class and fraternity meetings, political clubs, attendance at parties, banquets, legislative sessions, and other forms of distraction... The student is liable to excess; his judgment is immature, his habits unformed, his power of self-restraint undeveloped. He should no more neglect his studies for the purpose of attending the theatre or a game of ball than a teacher should leave his class or a merchant his store for such an object. So long as he yields to these temptations he can never attain that steadiness of application, that subjection of all else to the duty of the hour, which is one of the best fruits of a true education.

President Scott in 1891 pointed out the need for additional teaching facilities:

> The physical laboratory will scarcely accommodate for more than another year at most,the rapidly increasing numbers who are drawn to it by the popular interest in electrical engineering...The erection of the building for manual training will provide for all of the elementary work now done in the mechanical building, and thus create an opportunity for developing the work of mechanical engineering in its higher departments. This development is one which... the interests of the University imperatively demand... Mechanical testing is a field of growing importance, and mechanical engineers who have not been well trained in it will have but a slender chance in the contest with those who have been more fortunate or more wise.

Dr. Scott recognized the importance of the engineering studies:

> All agree that scientific and technical instruction has a primary claim to recognition in any policy that may be adopted for the University...The tendency of the times, seen in the rapid growth of manufacturing, the opening of new forms of industry, the extension of railroads, the multiplication of engineering structures of every kind and magnitude...and the spirit and attitude of the general intelligence, call for men familiar with the knowledge and

> trained in the methods that will be of service to society in what are called the practical pursuits... The scientific and technical college...must have a much more extensive equipment in buildings, laboratories, libraries, and teachers, and must therefore have a much more liberal support.

He foresaw the growing importance of graduate work:

> The universities of the future will be those that build another story at the top of the present system, and establish libraries, plant laboratories, and employ teachers for a range of study that lies beyond the boundaries of the present college course. Ohio should have such a university.

Assistant Professor Bradford reported that the drawing department had spent $537 for a dark room "with four developing shelves," cameras, and other "facilities by which instruction and practice in photography could be given." Apparently, though Thomas Mathew, the instructor in drawing had mentioned photography in his 1875 report, there was much more realization than formerly of the importance of that subject. Bradford wrote:

> The first class in photography at The Ohio State University, numbering sixteen, was formed during the spring term of the past year, and if the same earnest work existed in all classes of the University, few conditions, to say nothing of failures, would have to be recorded... The extended application of the subject to all scientific and technical work is of such importance that no one following such work can ignore its aid...

Professor Robinson reported needs in mechanical engineering:

> Appliances for experimental engineering will require about $10,000 to make the laboratory what it should be, including a first-class steam engine fitted with condenser, reheater, and steam dryer...The laboratory for experimental testing is not a visionary scheme, as several of the best schools of the country already possess similar equipment, and there is ample reason why Ohio should be second to none in its resources for turning out mechanical men of the highest qualification...

He specified the kind of instructional aid required:

> The assistant must be a graduate, because to be capable of conducting the work of the testing laboratory, he must be acquainted with the higher principles of mechanical engineering....

Professor Thomas of physics and electrical engineering wrote of the use of electricity in mining coal. The state chief mine inspector had invited the students in electrical engineering to accompany members of the Ohio Institute of Mining Engineers on visits to coal mines. The trip had been "instructive,affording the students an opportunity to witness the application of electrical machinery in the cutting and hauling of coal..."

Apparently 1891 was the year that electric street cars reached The Ohio State University. The catalogue for 1890-91 had stated:

> Two lines of street railrod reach the grounds. The white cars pass along the east or High Street line, and the green cars extend to the south line near the dormitories.

In the 1891-92 catalogue the campus was described as having:

> Athletic and drill grounds, a park-like meadow, and a few acres of primitive forest...The University may be reached by either the North High Street or Neil Avenue electric cars...

The 1891-92 catalogue described the Mechanical Building erected in 1879; the Electrical Laboratory built in 1889 with "building and outfit valued at about $16,000, of which $10,000 was appropriated by the General Assembly, and the remainder donated by various electric companies;" the Chemical Building completed during the summer of 1890 containing, among other departments, mining and metallurgy, the smelting furnaces and assay laboratory being in the basement. Hayes Hall, under construction, would be devoted to manual training, with drawing, modeling, wood carving, and photography on the third floor. Work in physics and electrical engineering was listed as

I. Physics
II. Electrical Engineering

and the facilities included "valuable opportunities given by the electric companies of Columbus" that "generously allow us not only to inspect their works but also to experiment freely with their machinery and circuits."

Civil engineering studies were "for students expecting to become surveyors or civil engineers...and students can at once begin practical work."

The course in mining engineering was "arranged for students intending to become mining engineers and surveyors, metallurgical or technical chemists..." The course in mechanical engineering had "for its first object the qualifying of men for the mechanical engineering profession. It aims to embrace preparation for such lines of pursuit as the successful management of machinery in manufacturing establishments; the superintendence of construction; the designing and laying out of machinery plants of mills and factories..."

According to the Trustees' report for 1892, there had been improvement of the grounds. Because of local pressure Neil Avenue had been graded and graveled through the campus and named Morrill Avenue in honor of the author of the land-grant act. The trustees suggested experiments in road making under direction of the engineering professors.

Something new in civil engineering was mentioned:

> A new kind of work, investigation and adjustment of instruments, examination and testing of brick, building stone and cement, gauging of the flow of water, etc...Graduates of the department find ready employment at good salaries; and the evident demand for educated civil engineers is causing a steady increase in attendance...

President Scott's report for the year ending June 30, 1893, mentioned the advent of Embury A. Hitchcock, M.E. from Cornell, who began in January, 1893, as assistant to Professor Robinson to conduct some of the advanced classes. Hayes Hall was ready for the course in manual training, and Arthur L. Williston, a B. S. in mechanical engineering from M. I. T., had entered on his duties in industrial art about the first of May. Another newcomer at the beginning of the academic year 1893-94 was Francis C. Caldwell, an arts and mechanical engineering graduate from Cornell, who was starting as assistant professor of electrical engineering --though his listing in the faculty, under the system then prevailing, was assistant professor of physics. Industrial arts included a machine shop where William A. Knight was foreman. Knight later got an M. E. degree and became well known as professor of industrial engineering.

An important improvement and addition to instructional facilities was mentioned in the 1893-94 catalogue:

> During the past year an electric power plant has been installed for the purpose of supplying current for electric lighting and for motors applied to various uses in the several buildings of the University... The wiring of the buildings and of the circuits in the tunnels was planned and carried out by students of the electrical engineering course. The power plant affords valuable opportunity for experimental work and illustrates the tendency of modern engineering practice...

Degrees listed in the catalogue included "that of Mechanical Engineer on those who have completed the course in Mechanical Engineering or that in Electrical Engineering,"and the degree of Bachelor of Science in Industrial Arts conferred on students who completed the course in industrial arts.

The Standing Committee of the School of Engineering consisted of President Scott, chairman; Professor Thomas, secretary; Professors Robinson, Lord, Brown, Bohannan, Eggers, Bradford, and Williston.

In the annual report for the year ending the 30th of June, 1894, the faculty listing included Edward Orton, Jr., E.M. '84, Director of the Department of Clayworking and Ceramics. Karl Dale Swartzel, M.Sc. was listed as fellow and assistant in mathematics; he was not above helping out in mechanical engineering when called upon, and he later became known to many engineers as a teacher of mechanics as well as mathematics. Charles W. Foulk, B.A., later to become well known as professor of chemistry, appears on the faculty roll as fellow and assistant in mining and metallurgy.

As reported in 1894, the description of the electric power and light plant shows the close connection between teaching and practice:

> Plans and estimates were submitted by Professors Robinson and Thomas. It has been the aim to make this plant as complete and efficient as practicable, for general purposes, and at the same time a means of instruction and illustration for the students in steam and electrical engineering. The engine and power generator were mounted and connected up by Engineer McCracken, while the main part of the electrical work was done by students in the electrical engineering course under the direction of Assistant Professor Caldwell.

There was special mention of the

Department of Ceramics

> The Legislature at its recent session passed an act requiring the establishment at the University of a department of ceramics, "equipped and designed for the technical education of clay, cement and glass workers in all the branches of the art which exist in this state, or which can be profitably introduced and maintained in the state from the mineral resources thereof..."
>
> Appropriations of $5,000 for the year 1894-5 and of $2,500 for the year 1895-6 were made for carrying into effect the above provisions. In accordance with the foregoing requirements, a department of ceramics has been established and located at Orton Hall. An expert possessing the qualifications prescribed in the act was found in the person of Edward Orton, Jr., a graduate of the University of the class of 1884, and he has been duly elected director of the department. He has entered upon his work with enthusiasm, and has already secured by gifts much of the machinery necessary to equip the department... The creation of this department, the first of the kind in this country, has awakened unusual interest among the clayworkers of the state who are giving the project their cordial approval and support.

In June 1894 the University granted twenty engineering degrees--seven in civil (one was C. E. Sherman, later a beloved professor and chairman of the department), four as Engineer of Mines, one simply Mechanical Engineer, and eight with the degree Mechanical Engineer in Electrical Engineering.

For the year ending th 30th of June, 1895, the faculty listing in the report included Frank A. Ray, E.M., assistant professor of Mining Engineering; and Thomas Ewing French, assistant in drawing. French had been assisting as a student all through his college course, and as a teacher he developed the science of what he called "Engineering Drawing." In June 1895 he received the degree of Mechanical Engineer.

Through 1895 the University had granted a total of 407/undergraduate degrees in course, 130 of them in engineering. (Some as tabulated were received later, "as of" earlier classes,) and"graduates in pharmacy" and none of the masters or doctors are included.) The largest number among the engineering degrees was in civil--a total of fifty. Mechanical engineer and Engineer of Mines each numbered 25. Though electrical engineering had got a late start, the total who had been graduated in that course was 40.

That summer of 1895 a new building was going up--the Emerson McMillin Observatory. Emerson McMillin, a native of Gallia County who had risen from boy-laborer in charcoal burning to public utilities tycoon and banker in New York, had done some reports for the Geological Survey of Ohio and had a great interest in science. McMillin had offered $5,000 for a building and $10,000 to equip an observatory. Professor Bradford had designed the building and work began in June, 1895. Warner and Swazey of Cleveland had contracted to furnish a 12-inch telescope and mounting.

Faculty changes included the departure of Assistant Professor F. W. Sperr to the Michigan School of Mines at Houghton; his successor was Frank A. Ray, E.M., Ohio State 1887, who had had practical experience in the coal mines of the Hocking Valley. Charles W. Foulk had resigned his fellowship in mining chemistry to do commercial work for the head of the department--Professor Lord.

During 1895-96, Professor Robinson had been ill and on leave, and E. A. Hitchcock, his assistant, had been in charge of the department, with assistance from Director Williston of Industrial Arts, who had taught thermodynamics, prime-movers, and machinery, and Henry C. Lord of mathematics and astronomy who had taught classes in mechanics. Mr. Lord had been promoted to associate professor of astronomy and director of the McMillin Observatory. Hitchcock had been promoted to assistant professor.

September, 1894, had marked the opening of the new department of ceramics and clay-working, with eleven enrolled. That department laboratory occupied the greater part of the basement of Orton Hall, recently completed at a cost of $102,000, and the kilns were in a small brick structure at the rear of the building.

Beginning the first of July, 1895, the University had a new president, Dr. James H. Canfield, who had been chancellor of the University of Nebraska. Early in the Canfield administration The Ohio State University underwent a

reorganization. The "schools, each governed by a committee, of which the president was chairman,were superseded by "colleges," each with a considerable degree of autonomy. One of the colleges was the College of Engineering.

So, in 1895, the College of Engineering at The Ohio State University had its beginning as a formal organization. Its history would not be complete, however, without a review of its background, from its origin dating back to the inception of the University, and its development through the School of the Exact Sciences and the School of Engineering.

THE SECOND QUARTER CENTURY OF THE COLLEGE OF ENGINEERING AT THE OHIO STATE UNIVERSITY

James Hulme Canfield took office the first of July, 1895, as president of The Ohio State University. From his report on his first year at Ohio State, it appears that Dr. Canfield came with the intention, and perhaps with the mandate of the Board of Trustees, to "put the institution upon a true university basis."

Dr. Canfield, as chairman, signed the report of the committee on Changes of Curriculum dated the 19th of November, 1895, in his bold backhand script. Joseph V. Denney, as secretary, signed in a smooth and much smaller inclined script, and added this longhand note to the typing: "For the Committee of whom there also were present and voting, Professor Scott (first session Nov. 13, 1895) and at both sessions Nov. 13 and Nov. 18, 1895, Professors Lazenby, Knight, Thomas, Bohannan, Kellicott, Brown, Hunt, Bowen, and White."

Denney was professor of rhetoric. He became chairman of the department of English when rhetoric and English literature were merged, and for many years was dean of the College of Arts, Philosophy, and Science.

This report contained what were modestly called "suggestions," of which the first three concerned plans to list students by course pursued and year and the intention to begin the first classes of the day at eight in the morning instead of at eight-fifteen. Then came the bombshell:

> Fourth, that the University be divided into six colleges; in one of which shall be the present courses in Arts, Philosophy and Science; in another the Engineering courses; One shall be known as the College of Agriculture; one as the College of Law; one as the College of Veterinary Medicine; and one as the College of Pharmacy. In this arrangement the short courses (not running to a degree) will stand attached to their proper colleges.
>
> Each College will have its own Faculty and determine its own requirements and curriculum, subject to the approval of the President of the University.

Here the typewriting ends, but Professor Denney's flowing script adds: "the fourth section to be adopted subject to the sanction of the Trustees if this is found necessary."

Continuing, the typed report of the Committee gave details:

> 5. It is understood that these suggestions are not to be in force until the opening of the next academic year; but that the assignments to the different Faculties be made at once; and that such Faculties proceed at once with the work heretofore assigned this committee -- reporting to the general Faculty for its approval. In this assignment to the different Faculties we suggest that each Faculty contain those at present entitled to vote in the General Faculty who are represented in one of these Colleges by required work.....

These suggestions were reported to the Faculty at its meeting the 20th of November, 1895, with the amendment to Section 5 that the president make the assignment of members to the faculties. The report, as modified, was adopted by the University Faculty the 11th of December, 1895.

President Canfield proposed faculty assignments in a typed letter:

> General Faculty of the State University:
>
> Gentlemen:
>
> In accordance with your action at your last meeting, I beg leave to recommend for your approval the following distribution of the Faculty under the proposed division of the University into six colleges.
>
> I have taken the liberty to suggest a provisional chairman for each Faculty in order that there may be someone with authority to call such Faculty together at such time and place as shall be most convenient.
>
> .....
>
> For the College of Engineering: Professor N. W. Lord, Chairman; Professors Orton, Lord, Thomas, Bohannan, Brown, Eggers, Williston, Bowen, Denney, Bradford, McPherson, H. C. Lord, Hitchcock; Professor Edward Orton, Jr., provisionally.....

Formal organization of the College of Engineering Faculty took place the 18th of December,1895. The hand-written entry in the first Record Book reports:*

> The Faculty of Engineering met for the first time in the reception room in response to a call by Prof. N.W. Lord. The meeting was called to order by Professor Lord at 7:45 p.m.

Those present were Professors N.W. Lord, H.C.Lord (astronomy), Thomas (physics), Eggers (German),Brown (civil engineering), Bowen (French), Denney (English), Williston (industrial arts), Edward Orton,Jr. (ceramics), Bradford (drawing), and McPherson (chemistry). Prof. N.W. Lord was uanimiously elected "chairman" and Professor Williston was elected permanent secretary. Those minutes were approved by N.W. Lord, "Dean."

Professor N.W. Lord received the E.M. degree from the College of Mines of Columbia University in 1876. He was chemist of the Geological Survey of Ohio 1880-1888, chemist to the State Board of Agriculture 1889-1899, and chemist to the State Board of Health 1896-98, as well as consulting engineer. It was as a chemist that he had come to Ohio State in the fall of 1878. In 1879 he was placed in charge of the department of Mining and Metallurgy, and he taught those subjects until Mining and Metallurgy, in 1896, was split into the two departments of Metallurgy and Mineralogy, and Mining. Professor Lord was then chairman of the department of Metallurgy and Mineralogy until his death, in May 1911.

Despite his busy academic schedule, Professor Lord, even as dean in addition to being professor, appears to have been supposed to eke out his salary with outside work. For the last year he served as dean, his budgeted salary was only $2,000. He was a conscientious teacher; the memorial to him, signed by three colleagues in the College of Engineering--Professors Ray, Thomas, and Hitchcock--stated: "His constant struggle was to ground his students thoroughly, well assured that upon such a foundation they would erect a secure superstructure. In addition, he contributed many papers to scientific societies and journals."

Professor Hitchcock, in his autobiography, described Lord as "one of the most original thinkers in the field of chemistry that the United States has ever produced." Hitchcock mentioned "his familiarity with basic principles

*Engineering College faculty minutes were written in ink for more than three years. Beginning with the meeting of the 9th of May 1899, the minutes were typewritten and the typed sheets were pasted in the record book. The second record book, in which the typed sheets were bound, begins with the report of the special meeting of June 20,1902.

and his remarkable ability to put his finger on the weak or impossible element in any proposal." On the human side, "he was a great 'kidder' of engineers in lines other than his own field...His blanket explanation for the way some things appear to go wrong, no matter what precautions are taken, was 'the innate cussedness of inanimate objects.'"

Academic year 1895-96 was notable in the annals of the Ohio State University for other reasons than the organization of the colleges. The Emerson McMillin Observatory had been constructed, at a cost of $5,476.25, and the telescope and other equipment were being received. The fitting up of the Observatory had a great effect on the future of one of the students, a senior in civil engineering.

Edwin Foster Coddington was his name. Because of the Observatory, he was destined to take graduate degrees in a science that he had not contemplated, and to become, not only a noted professor in the University but also to be acting dean of the College of Engineering for five years.

Coddington was living at the South Dormitory and supporting himself in college by delivering the morning Ohio State Journal in downtown Columbus. He would rise very early, and, because the street cars had not started to run, would walk more than two miles to the center of the city and then do additional walking to deliver his papers. He would then ride the car back to the campus and go to class. He fell asleep in Prof. H. C. Lord's astronomy class. In his apology he explained his early morning work.

"Suppose you quit your newsboy job," suggested Lord, "and help me get the equipment of the Observatory in working order."

He did, and the University financial report for 1895-96 lists E. F. Coddington as janitor of the McMillin Observatory at $240 for the year. In setting up and adjusting the equipment, Coddington became thoroughly familiar with it, more so, even, than Professor Lord. Dedication ceremonies of the Observatory were held at Commencement , the 15th of June, 1896, when Coddington

received the degree of Civil Engineer. A letter from Emerson McMillin announced establishment of a graduate fellowship for study of astronomy. Without consulting Coddington, Professor Lord stated that the first McMillin fellow would be E. F. Coddington. So, instead of having a career as civil engineer or land surveyor, Coddington spent a year as "resident graduate" in the College of Arts, Philosophy, and Science and received the M.Sc. degree in 1897. He spent a few years at the Lick Observatory in California, and then, with the aid of Mr. Julius Stone, amateur scientist and long-time member of the Ohio State University Board of Trustees, attended the University of Berlin where he achieved the Ph.D. in astronomy in 1902. That year he came to Ohio State to teach mathematics, taking the place of an assistant professor who was on leave for graduate work. In 1910, Mr. Emerson McMillin paid the expenses of Professors Lord and Coddington to Hawaii to observe Halley's Comet.

A physical change on the campus that got started in 1895-96 was construction of a reservoir, near the power plant, to contain 500,000 gallons of water pumped from a well in the low ground near the Olentangy River. Chief Engineer McCracken--in 1912 his title was changed to superintendent of buildings and grounds--had recommended it for fire protection and, because the well water would be softer and less corrosive than city water, for boiler feed. That reservoir, built in 1896 at a cost of $2,500, was located just north of Brown Hall and was a campus fixture for many years.

That same year the University abandoned its little artificial gas plant on the campus and accepted the offer of the Columbus Gas Company to furnish all illuminating gas needed for ten years at 75¢ per thousand cubic feet.

President Canfield's 1895-96 report noted that because of illness, Prof. S. W. Robinson of mechanical engineering had been on leave. His work had been carried on by Assistant Professor Hitchcock, with the help of Professor Williston of Industrial Arts and Mr. Swartzel of Mathematics.

President Canfield expressed himself on the need for teaching assistants to have diversity in getting graduate education:

> The plan of giving half time to University duties and half time to post graduate studies is excellent. But after two years the student should go elsewhere for his third degree... with advantage of change of condition and environment...The University should discourage continuous work of a student after the second post-graduate year...Nor should a post-graduate be employed as an instructor unless manifesting peculiar characteristics and special training in methods and philosophy of education...

One of the changes noted in the report for the year 1896-97 was a division of the department of Mining and Metallurgy. Nathaniel W. Lord was listed as having been during 1895-96 professor of Mining and Metallurgy and dean of the College of Engineering (although the College didn't officially come into existence until the end of that academic year) and as being for 1896-97 professor of Mineralogy and Metallurgy and dean of the College. Frank A. Ray, E.M. 1887, during 1896-97 was associate professor of Mining Engineering.

William Lloyd Evans, who was to become a noted professor of chemistry, was changed for 1896-97 from fellow and laboratory assistant in general chemistry to first assistant director of the department of Clay-working and Ceramics.*

Dr. Canfield considered the University, with its diverse colleges, as a continuation of public instruction, "practically the 13th, 14th, 15th and 16th grades of the state system of free public education."

President Canfield's theory of organization of the University to some extent put the departments and colleges on a competitive basis:

> Each department is practically independent of all the other departments, though co-ordinated with them; it is the peculiar business of the head of each department to push his work, enlarge its scope, and increase its value, precisely as though it were a private enterprise.

Appointments beginning with the year 1896 included William T. Magruder as chairman of the department of Mechanical Engineering; James E. Boyd as assistant professor of Physics, and C. E. Sherman as assistant in Civil Engineering. All these men had great influence in the College of Engineering, and Boyd served for a time as acting dean of the College.

During 1896-97, according to President Canfield's report, there was intense activity on the part of faculty and students, with "little or no friction between

*Chemical Engineering got its start in 1896 when Professor McPherson outlined for the Engineering faculty a 4-year course leading to a B.S. in chemistry or metallurgy.

them, and exceedingly gratifying results. The work of the colleges was the "subject of constant study," with changes made when they seemed desirable. He saw the "need for a new building for the College of Engineering, with a locomotive laboratory."

Satisfactory student-faculty relations continued. President Canfield's report in June 1898 mentioned "practically no call for 'discipline' in the usual sense of the word." A few students had

> Gone home before the close of the year because they did not appreciate what the state is doing for them, nor the exceptional opportunities offered here; but there has been no lawlessness and no 'outbreak' and no conduct that has caused serious or prolonged anxiety.

Mr. Evans of the Ceramics department had resigned in December 1897 to teach high school in Colorado Springs. He returned to Ohio State in 1905 (with a doctorate from the University of Chicago) to teach chemistry and as "Billy Evans" became a campus tradition and active member of the College of Engineering faculty when the department of Chemistry was included in the College for administration.

In his 1898 report, President Canfield recognized professionalism:

> The expert services of Dr. Orton and of Professors Brown, N. W. Lord, Weber, McPherson, Thomas, Ray, Magruder and others of the faculty of the College of Engineering are in constant demand.

Frank E. Sanborn came from Tufts College in September 1898 to be director of the department of Industrial Arts, replacing Professor A. L. Williston.* Those gentlemen had graduated together at M.I.T. in 1889. The course in Industrial Arts of the College of Engineering was described in the catalogue "for those wishing to be teachers of manual training and intending to enter manufacture and industry, not as engineers but as practical managers, superintendents, or businessmen."

Instruction in architecture was offered, beginning in 1896, by the department of Drawing, "to meet a growing demand for special training along this line" because "the employment in architecture of so many young men trained in other branches of engineering seems to prove the urgent need of those whose training is directed expressly to this end." Proving the versatility of some engineers, the teacher of

*When Professor Williston resigned, Edward Orton, Jr., was elected secretary of the College of Engineering.

architecture (later head of the department after Architecture and Drawing were separated, and also University architect) was Joseph N. Bradford, who had been graduated in 1883 with the degree of Mechanical Engineer. *

On the 13th of June,1899, William Oxley Thompson was elected president of the University. William Edwards Henderson came that year to be assistant professor of analytical chemistry; later, as professor of chemistry, he would be active in the College of Engineering, and author, with William McPherson, of widely used textbooks.

During the summer of 1900, at a cost of $4,557.95, the University built a residence next to the Observatory for Prof. H. C. Lord (who, because of his initials was known to many generations of engineering students as "Hydrochloric") so he would be handy for night work. Later the Trustees authorized electric lights in the Observatory until three A. M. for experiments.

Enrollment during 1899-1900, first year of the Thompson administration, was 1252, the largest in the history of the University. A new rule of the Board of Trustees made more full professorships available "when demands within the department and experience and success of the teacher makes it desirable."

In the catalogue for 1900-1901, the University power plant was described as "a model 2-phase plant." The electrical part of it had been for the most part installed by students "of the department of Electrical Engineering. The repair and maintenance of this plant is done by the students who receive compensation for the time so spent."

There was an engineering society, described in the catalogues as an "organization of students and instructors, holding meetings bi-weekly, for the consideration of questions in the various branches of engineering."

President Thompson, reporting in 1901 on the College of Engineering, stated that:

*That course in architecture first offered in 1896 extended over three years. The four-year course was established in 1900. On motion of Professor Brown, in meeting the14th of May 1901, it was voted that "it is the sense of this Faculty that the title of the Department of Drawing should be changed to the Department of Architecture and Drawing, with corresponding change of the title of the professor in charge."

> Its growth is so phenomenal and its prospects so flattering that the question of properly providing for its work cannot long be deferred. Whether a very large building or a group of smaller buildings would be preferable might be difficult to decide... At all events, from 3 to 400,000 dollars would be necessary to make anything like adequate provision for the several lines of engineering...

University physical facilities furnished testing opportunities for students, as described under "Mechanical Engineering" in the catalogue for 1901-1902:

> In addition to the apparatus and equipment of the power plant of the University, the power house at Townshend Hall contains a horizontal, return tubular boiler, two steam engines, and an ammonia refrigerating machine, making the facilities on the campus for testing quite complete. Machinery, apparatus and appliances are continually being presented, built, or purchased, and the student is given an opportunity to test everything under practical conditions of operation. Besides the laboratory facilities, opportunities frequently arise to test machinery, engines, or boilers in the city, and in these tests the students take part.
>
> The buildings of the power plant were completed in 1896, and, with their contents, form a model plant....There are installed on the campus over eighteen hundred incandescent lamps, twenty-four arc lamps, and about 250 H.P. in motors. The electric plant is for the most part of the Westinghouse system...

In April, 1901, contracts were awarded for extension of the "heat, light, and power plant" because:

> The gradual introduction of electric power and light into all the laboratories and departments where these elements have been found useful and convenient had so drawn upon the capacity of the present plant that a portion of the time when the University was in session the engines and generators became overloaded beyond the supposed limit of safety...

When the academic year 1901-1902 began, the College of Engineering had a new dean, elected by his colleagues* The second dean of the College was Professor Christopher Newton Brown of the department of Civil Engineering. His tenure was brief; he died suddenly on the 6th of March, 1902. According to the University report for the year 1901-1902:

> He had already shown administrative ability of a high order. When he was taken ill he was engaged in devising plans for improvements in methods of administration of the college, and had developed a general scheme for needed buildings and equipment which has since been partially carried out by the engineering faculty in the plans prepared by them for an engineering building...

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*Also, there was a new secretary, Prof. F. E. Sanborn of industrial arts.

Part II of the report for the year ending in June, 1902, the 1902-1903 catalogue, describes the offerings of the College of Engineering:

> Since the inception of the University, the College of Engineering has maintained a vigorous and steady growth...The State has advanced and shaped public opinion by providing education facilities somewhat in advance of public demand. Through its University it has established and built up a system of technical education which is more important than any other single agency in the development of the commercial and industrial interests of Ohio. The marvellous industrial progress made in this State and country in recent years is the best indication of the benefits which have already begun to accrue from the enlargement of technical training and from its constant subdivision and expansion.
>
> At present the College offers instruction in nine important fields of Engineering Work. Covering these, the following four-year courses of study are given:
>
> 1. Architecture, leading to the degree of Civil Engineer in Architecture (C.E. in Arch.). Established in 1900.
> 2. Ceramics, leading to the degree of Engineer of Mines in Ceramics (E.M. in Cer.). Established in 1896.
> 3. Chemical Engineering, leading to the degree of Bachelor of Science in Chemical Engineering (B.Sc.). Established in 1902.
> 4. Civil Engineering, leading to the degree of Civil Engineer (C.E.). Established in 1873.
> 5. Electrical Engineering, leading to the degree of Mechanical Engineer in Electrical Engineering (M.E. in E.E.). Established in 1889.
> 6. Industrial Arts, leading to the degree of Bachelor of Science in Industrial Arts (B.Sc.). Established in 1893.
> 7. Manual Training, leading to the degree of Bachelor of Science in Industrial Arts (B.Sc.). Established in 1893.
> 8. Mechanical Engineering, leading to the degree of Mechanical Engineer (M.E.). Established in 1879.
> 9. Mining Engineering, leading to the degree of Engineer of Mines (E.M.). Established in 1878.

In addition to these degree courses, the catalogue listed the three two-year "short courses," one in clay-working established in 1894, one in industrial arts and shopwork established in 1896, and one in mining established in 1887. This was the first listing of a course in chemical engineering; previous catalogues showed a curriculum leading to a B. Sc. in chemistry, established in 1897.

There was a little crowing about the University's offerings in engineering:

> The instruction necessary to the completion of these various courses of study is given in twenty-one different departments, under eighty-four professors and assistants. In addition, in some of the courses in this College elective work is offered, which may be taken from any of the thirty-seven departments of the University.

Also, the catalogue gave a rationale for a uniform first year in the engineering courses:

> All engineering education is based on the constant use of the fundamental sciences, mathematics, physics and chemistry, supplemented by training in the art of expression, both by language and by drawing. It naturally follows, therefore, that all engineering courses start from a common point, proceed side by side for a time, but specialize and subdivide more and more as they progress toward completion, until in the last year they present but little work in common.
>
> Further, it is very commonly the case with young men entering college for a technical education, that they are following ambitions not founded on any knowledge of their own natural aptitudes or capacities, and that they are in no way prepared to make a wise or final selection of their life work at that time.
>
> For the two foregoing reasons, the first years of each of the engineering courses leading to a degree, are made identical throughout. The student is enrolled as a 'First-year Engineer.' His selection of the course he wishes to pursue is deferred to the opening of his second year, by which time he has become acquainted to some extent with University standards and methods, with the scope of the various courses offered, and with his own tastes and powers.

Those first-year studies included mathematics all year, chemistry all year, a modern language (French, German, or Spanish) all year, English composition all year, and drawing all year. (The first two terms of drawing were "free hand;" the third was "lettering.") Shopwork courses in the summer term were required for students electing chemical, electrical, and mechanical engineering.

Prosperity brought penalty. According to the Engineering section in the University report for the year 1902-03:

> This college has suffered perhaps more than any other in the University from the rapid growth in numbers. The requirements of a technical education are imperative and expensive...If the present rate of growth increases it will not be long until there will be a thousand students studying in the several lines of engineering now offered. This technical education is of such importance that we cannot afford to neglect it.

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It appears that records of the College of Engineering faculty meetings begin with the minutes of the special meeting of the 20th of June, 1902. The new dean, Professor Edward Orton, Jr., presided, and Prof. F. E. Sanborn was secretary. The Board of Trustees had ordered the engineers to present plans for an en-

gineering building and an addition to the chemical building. The plans had to be presented by the first of August. Professor Bradford was requested to act as architect.

March to June 1902, following the illness and death of Dean Brown, Prof. N.W. Lord was acting dean of the College. Then the Engineering College faculty elected a new dean, Edward Orton, Jr., the professor of Ceramic Engineering and director of the School of Clayworking and Ceramics. Professor Orton had lived on the campus in the President's residence and had been graduated with the degree Engineer of Mines in 1884. Before establishing the course in ceramics in 1894, he had worked in industry as chemist of the Columbus and Hocking Coal and Iron Company; superintendent of Bessie Furnace; and chemist at iron works in Homestead, Pennsylvania. Before his death in 1932, Dean Orton distinguished himself in education administration, research, industry, and military service.

At this special meeting the consensus was that the group of engineering buildings should be located in the field north of the power plant, with civil engineering and architecture facing west in the eastern end of the field, mechanical and electrical engineering facing north in the southeast part, mine engineering and ceramics in the northeast part facing south.

This plan was threatened by a proposal to put Ohio Field north of the power house and south of Woodruff Avenue, as advocated by the Athletic Board represented by Prof. George W. Rightmire of the College of Law and Prof. B.F. Thomas of the department of Physics and agreed to by the Board of Trustees. Engineers and Athletic Board representatives sparred for some time. The threat was finally resolved in favor of the engineers at the Trustees' meeting the 9th of November, 1905, when, with representatives of both sides present, it was "mutually agreed that the present site, with an additional portion of the woods, would be very satisfactory for future athletic needs." The "present site" was on High Street south of Woodruff Avenue.

On schedule, at the Trustees' meeting the first of August,1902, Dean Orton and Professor Bradford presented plans and specifications for an engineering

building. The contract was let the 11th of March 1903 to D. W. McGrath, and work began the 16th of March for a "brick structure with high basement story above grade and two stories above" to accommodate the departments of Architecture and Drawing and Civil Engineering. July 3, 1903, on the recommendation of President Thompson and the Engineering College faculty, the Trustees named the building Brown Hall. According to the president's report, Brown Hall was completed at a cost of $80,717.17 and was occupied in the fall term of 1903. The Engineering College faculty's first meeting in the new building was January 12,1904. In meeting the 19th of October 1904 the Trustees directed President Thompson to thank Professor Bradford for the two electric lamp clusters he had presented to complete the front of Brown Hall, and also to convey appreciation to Professors Bradford and French for free architectural services for the Lake Laboratory.

Prof. Emeritus S. W. Robinson presented to the Engineering College faculty meeting of the 17th of February 1903 his plan for the Stillman W. Robinson fellowship in engineering, open to civil, electrical, and mechanical graduates from Ohio State of other colleges.

Dean Orton, at the faculty meeting the first of November 1904, called attention to the need to outline the work of the present four-year courses so the studies would be in proper order if a student required five years.

Meeting the 3rd of November 1903,the College faculty expressed sympathy to Purdue University "in the wholesale calamity to the student body in the railroad accident of October 31, 1903."* This message of condolence was sent to the Purdue President before the memorial service on the 11th of November, 1903.

* From the 1903-04 reports of Purdue University:

> While the year's history contains much which is the source of the profoundest gratification, it records also a misfortune, unequaled in the experience of educational circles, in the railway disaster of October 31, 1903. An excursion train on the Cleveland, Cincinnati, Chicago and St. Louis Railroad, bearing over one thousand students of Purdue to a friendly and absorbing football contest with the students of Indiana University, was involved in collision within the city limits of Indianapolis; the foremost car, occupied principally by the football team and officials, was completely destroyed and no one of its occupants escaped death, or more or less serious injury. Eighteen lives were sacrificed, of whom sixteen were students and alumni....

Early in 1904 the Chemistry Building burned, throwing Metallurgy and Mineralogy and Mining Engineering out into the cold. The following September the Trustees let the contract for a School of Mines building to be faced with "B-G special repressed wire cut shale brick" and completed by September 1905. Professor Bradford was not the architect, and there were delays and troubles, but the building was accepted the 7th of March, 1906, with $1000 retained to cover correction of omissions. In a letter to the Trustees the 7th of February, 1907, Mr. McCracken reported that the building roof had been repaired:

> Six rods tie the purlins together in the main or center part of the building, and two in each end are used. These rods will in all probability prevent a further spreading of the roof.

Promptly the Trustees elected Professor Bradford architect of the proposed engineering buildings, his compensation to be 2½ per cent of the contract cost, with allowance of not to exceed $250 for assistance.

At a special meeting of the Engineering College faculty the first of November 1905, a committee had reported that the engineering buildings should be located close together, and ground should be reserved to increase their size by wings in the rear. Further:

> Since location of the School of Mines Building appears to estop extension of Hayes Hall northward, except with undue crowding, space should be reserved for a new engineering-shops building to take the place of that part of Hayes Hall now used for shop work.

Brown Hall, the Mines building, the power house and boiler house were thought by the committee to be "permanently fixed" in location. The committee recommended reserving space north of Brown Hall for the proposed mechanical-electrical building, space east of Neil Avenue and northwest of the power house for the new shops building, and space between the proposed site of the mechanical-electrical building and Woodruff Avenue for another engineering building "which will be needed in the not too distant future."

At the College faculty meeting the 8th of May 1906, Professor Orton announced that he was resigning as dean, effective at the close of the academic year. Professor Sanborn declared he was quitting as secretary. At the June 5 meeting,

Orton's resignation was accepted, but Secretary Sanborn withdrew his resignation "for the time being" after the faculty passed a motion that the term of service of both dean and secretary should be two years, with election at the first regular meeting in June in alternate years. Prof. F. A. Ray of Mining Engineering was unanimously elected dean of the College of Engineering.

Frank Arnold Ray, fourth dean of the College of Engineering, received his E.M. at Ohio State in the class of 1887. After experience in construction work and mining engineering, he became assistant professor of mining engineering at Ohio State in 1895, associate professor in 1897, professor in 1900. He headed Mining Engineering after it was split from Metallurgy and Mineralogy in 1896. He served as dean two years, 1906-1908. He continued as professor of mining engineering until 1921, and then was consulting director of the School of Mines until he retired in 1928. On leave of absence at various times, he investigated coal deposits in Russia, Nova Scotia, and the Pacific Coast.

Coincident with his resignation as dean, Professor Orton, in a letter to President Thompson dated May 15, 1906, reported in depth on the first decade of the College of Engineering.

He cited enrollment figures showing the rapid growth of the College since the formal division of the University into colleges, and the high percentage of engineering students in the student body:

Year.	Total Attendance at University.	Attendance of College of Engineering.	Percentage [illegible] engineering [illegible] dent.
1896	959	313	32.8
1897	1,619	288	17.7
1898	1,095	309	28.1
1899	1,166	391	33.5
1900	1,331	485	36.4
1901	1,415	589	41.6
1902	1,603	659	41.0
1903	1,683	729	43.3
1904	1,723	716	41.5
1905	1,914	780	40.7
1906	2,014	787	39.0

> These numbers indicate that the College of Engineering has become a large organization in a very short time, and further that the College constitutes a considerable part of the total registration...as it has constituted about 40 per cent of the total attendance for a number of years past.

His explanation for the rapid growth of engineering colleges was:

> First, the enormous commercial expansion which has taken place in the United States since the panic of '93-96 subsided. This period of prosperity has brought the engineering and manufacturing industries into a condition of activity never before paralleled, and it has put the engineering profession of the country to a great strain to meet the demands for new transportation,new manufactures, new mines, etc...It has become quite usual for engineering graduates to have offers from as many as two or three firms to select from in beginning their practical experience...
>
> A second reason for this expansion of engineering education lies in the fact that manufacturers, administrators in all sorts of large industries, and men at the head of commercial concerns, are finding out that the training which young engineers are compelled to undergo leads to efficiency in other walks of life than engineering, but particularly in all matters of administration. Whatever may be said as to the cultural value of an engineering education, it seems at least to be fairly well established that it produces men who are able to adapt themselves readily to other kinds of work than engineering, and to bring to the performance of such work, a mental alertness, an accuracy of thought, and a power of concentration which forms the strongest possible guarantee for their efficiency...
>
> The question of a five years' engineering course has been before our Faculty several times, each time with increased favor...It is greatly desired that in two years when the immediate pressure in the departments of Mechanical and Electrical Engineering for more space and more equipment can be partly met, to adopt a four years' course similar to that now offered, and give for it only the bachelor's degree, and to offer an additional year's work, which all of the abler students will be urged to take, and for which the engineer's degree will be given...This plan should not be confused with another plan, which has been before us for a discussion a number of times, namely the plan of allowing a four-year student five years in which to complete his work.

He recommended dropping the College of Engineering curriculum in manual training, a course that might be offered in the proposed College of Education. He was not in favor of continuing the four-year course in Industrial Arts either:

> This course seems also to have failed in a large measure to justify itself. The number of graduates is very small; the number of students enrolled at no time is large or important, and the training does not seem to fit them for work materially different from that which can be gotten in Mechanical Engineering...

Dean Orton felt, however, that the industrial arts subjects should be kept among electives for mechanical engineering students, and that the short course in industrial arts should be retained, and even a shorter course for artisans might be offered. He recommended strengthening the course in chemical engineering by bringing in "some person who has had engineering experience in applied chemistry." Also:

> I recommend that an arrangement be made, by which a suitable person will give instruction in elementary law to the students of the College of Engineering...This work should not amount to more than three hours per week for one term,but should be offered in all engineering courses...

A further recommendation was:

> That courses of lectures from eminent engineers should be made a part of the training of our courses of instruction...The advantage to the student of seeing and hearing eminent engineers is obvious...

Declaring that "the four years, 1902-1906, have been most important ones in the College of Engineering, in the matter of improvement of material resources," Dean Orton cited the new Chemistry Building, replacing the one that burned in 1904 because "about one-half of the work of the Chemical Department is done for the College of Engineering;" the new Physics Building costing $80,000, with $20,000 worth of new apparatus, where "of this equipment, the large bulk is employed in teaching the engineering courses;" the School of Mines building costing $85,000,with $22,500 worth of equipment for Metallurgy, Mining, and Ceramics that would "assemble under one roof a more complete and more adequate equipment for instruction in the mineral industries as a whole, than is offered elsewhere in the United States."

There was an obligation to make good use of such facilities:

> These new resources have placed a new responsibility upon us, and to this duty the Faculty of the College of Engineering are addressing themselves in deepest earnest. I wish to say that the Faculty as a body is most loyal and devoted to the Engineering Profession, and that personally each is an enthusiast in his special field...

In meeting the 10th of October,1905, the Engineering College faculty pondered a letter from Heidelberg College inquiring about an arrangement whereby after three years at that liberal arts school a student could study engineering for two years at Ohio State and receive a degree in engineering as well as in arts. Such cooperation with other colleges was considered at subsequent meetings and conferences. In the 1906 report of the University, Dean Denney of the College of Arts, Philosophy, and Science stated: "As soon as the new requirements for admission to the College of Engineering go into effect, making them equal to those of this college, the chief obstacle to the adoption of a combined six-year Arts-Engineering course will be removed." Programs were eventually worked out for combined courses, not only for students of liberal arts, but also for students in agriculture and other professional courses.

Echoing to some extent statements in Dean Orton's letter of May 15, 1906, Professor Sanborn, in the College faculty meeting the 4th of December, 1906, offered a motion that the College of Engineering abolish its course in manual training, since that work might be given in the proposed College of Education, and that the name of the course in Industrial Arts be changed to Industrial Engineering, the degree to be B.Sc. in Industrial Engineering.

Dean Orton's letter had suggested organization of a department of Mechanics, taking that work from the department of Mathematics. That department was organized in 1906, with Prof. J. E. Boyd as chairman, and E. F. Coddington as assistant professor.

Professor Bradford, architect for the new engineering building, in March, 1907, recommended awarding the contract to McGrath, with various sub-contracts, including installation of the heating and ventilating equipment under the supervision of Engineer McCracken and Prof. E. A. Hitchcock. The total of the contracts was $74,101.85, under the estimate by $868.15. The engineering laboratories building was accepted at the Trustees meeting the 15th of January, 1908. That year the Legislature appropriated $20,000 to equip the laboratories.

At their November 1907 meeting the Board of Trustees appointed Charles E. McQuigg student assistant in the department of Metallurgy and Mineralogy at $35 per month. McQuigg (he later spelled it MacQuigg) received his E. M. degree in 1909, and 28 years later became dean of the College of Engineering.

In the College faculty monthly meeting of February 1908, Professor Magruder moved that the dean appoint a committee of five to consider what the faculty, acting as citizens, could do to persuade the United States Congress to establish engineering experiment stations at the Land Grant colleges.

Recalling at the June 1908 meeting that the Engineering College faculty had decided to elect the dean at the first regular meeting in June in even numbered years, Dean Ray called for nominations, stating at the same time that he would not accept re-election. Professor Orton was nominated and elected unanimously, but, according to the minutes:

> Professor Orton, who had risen to speak before the motion was put to vote, was recognized by the chair. Professor Orton called attention to the lack of any real authority in connection with the office of dean at present, and stated he would not consent to accept the office of dean unless the powers and duties of the position were definitely fixed by the Board of Trustees. He presented the following statements as imparting his ideas of the scope of the powers and duties.
>
> THE APPOINTMENT, POWERS, AND DUTIES OF DEANS
>
> OF COLLEGES IN THE OHIO STATE UNIVERSITY
>
> (1) Appointment to be made by the Board of Trustees on recommendation by the President and on nomination by the Faculty of the College.
>
> (2) The appointment to be for no fixed term but to be depending on giving satisfactory service.
>
> (3) The teaching work of the dean to consist of such courses as he voluntarily desires to carry in the department with which he may be affiliated.
>
> (4) The dean to have entire supervision of the attendance and minor discipline of the students registered in his college, with power to suspend for one month as a maximum punitive measure...
>
> (5) The dean to be the general assistant to the President in carrying into effect in his college the rules of the University Faculty and the orders of the President and the Board of Trustees.

(6) The dean to have power of nomination in the matter of new appointments, or of changes in grade in the teaching force under him. All requests from departments touching this subject to be transmitted to the President through the dean.

(7) The dean to have advisory power in all matters affecting the apportionment of funds among the departments giving instruction in his college and all departmental requests touching this subject to be transmitted to the President through the dean.

(8) The dean to be the presiding officer of his college faculty. In the General Faculty, his duties to be such as are provided for under the University Faculty rules.

(9) A sufficient annual appropriation for the use of the dean in furthering the interests of his college by lectures, exhibits, special advertising, traveling expenses, etc., should be provided.

After these suggestions had been heard, a motion by Professor Lord carried, that further steps in the election of the dean should be postponed. A committee consisting of Dean Ray and Professors N. W. Lord, R. D. Bohannan, C. E. Sherman, and J. E. Boyd was appointed to urge the President to take steps to get the Board of Trustees to act on the matter. This committee, on the 18th of June, reported to the Engineering faculty that the President concurred with the suggestions in general, and would discuss the subject with the present deans before reporting to the Trustees.

Dean Ray was not present at the Engineering faculty meeting the 6th of October, 1908, and Prof. B. F. Thomas was chosen chairman. A letter to the faculty from Dean Ray was read by the secretary. It stated that "at Commencement time the President requested me to continue as temporary dean, which I have done." However, Professor Ray had asked for and had been granted leave of absence without pay, and he requested the Engineering College faculty to elect another faculty member to act as temporary dean until the matter was decided.

Professors N. W. Lord and F. C. Caldwell were nominated for acting dean. The ballot count was Caldwell 18, Lord 13, and on motion by Prof. Lord, Professor Caldwell was unanimously elected.

Francis Cary Caldwell (he preferred "Frank") with degrees from Cornell of A.B. 1890 and M.E. 1891, and experience 1891-92 with the Thomson-Houston Electric Company and study at the National Polytechnic School in Zurich 1892-93, had come to Ohio State in the fall of 1893 as assistant professor of electrical engineering, then in the department of Physics but made a separate department in 1897. His particular professional interest was lighting. At a Phi Beta Kappa banquet he once explained to the chairman of the department of English that the reason automobile head lamps seem so ineffective on wet pavements is because of the specular effect.

Professor Eisenlohr of the department of German persuaded the Engineering College faculty meeting in December 1908 to resolve that students from non-English speaking countries should have a course in English specially adapted to their needs. The reply from Prof. J. V. Denney, incorporated in the Engineering College minutes for February 2, 1909, gave the proposal short shrift:

> As the President deems it unwise to expend University money for the purpose expressed in your resolution, I have thought it unnecessary to proceed to make a course for natives of non-English speaking countries...
>
> I consider it due to your honorable body, however, to state briefly the reasons why I am in accord with the views of the President in this matter.
>
> (1) A course especially adapted to the needs of such students is not required of the University as a duty. The University exists primarily for Ohio students, and all other students are here as a matter of gratuity on state sufferance. The expense to the University for educating one student in the College of Engineering during the year 1908-1909 is $116.17, and the cost of each graduate of the College on the basis of the last ten years is 2175.97...
>
> (2) As a matter of expediency, we should hesitate long before attracting many more non-English speaking students. They present many problems in all of their classes--not arising exclusively from their lack of English. Should special facilities be afforded them for meeting the language difficulty, their numbers would greatly increase...

At the April meeting, 1909, the faculty of Engineering voted that its secretary should be elected for two years, the election to be at the May meeting of each odd-numbered year. The 4th of May, 1909, Prof. E. F. Coddington was unanimously chosen secretary. He succeeded Prof. J. E. Boyd, who had been signing the minutes as secretary, beginning with the meeting of October, 1907.

Change-over from the term plan to the semester plan was in the offing, and a special order of business at the faculty meeting the 30th of November, 1909, called to order by Acting Dean Caldwell, was to consider a committee report on semester courses, discussion to be "limited to questions concerning the ability of the departments to provide instruction in the subject scheduled." The committee, Professors E. F. Coddington, Horace Judd, James R. Withrow, F. H. Eno, and F. E. Sanborn, recommended a semester arrangement for the first year in engineering, urged the departments responsible for degree courses to readjust them at the earliest possible moment, and stated further:

> It is advisable to introduce five year courses in the Engineering College, but the present time is not propitious for such action since the problem is too large to be taken up in connection with the adjustment to the semester plan. We therefore recommend that in the adjustment of courses the several departments keep in mind the possibility of introducing such courses.

That meeting the 30th of November 1909 was the last at which Professor Caldwell presided as acting dean. The meeting of the 7th of December was "called to order by Prof. J. E. Boyd, acting dean during the absence of Prof. F. C. Caldwell." During the remainder of academic year 1909-1910, Professor Boyd was considered acting dean, though at the meeting of June 7, 1910, Professor Sanborn was "called to the chair," and Prof. N. W. Lord was "asked to take the chair" at the June 17 meeting. Boyd signed the minutes of both those meetings as "acting secretary." In what appears to have been a delayed action, the Board of Trustees, meeting the 28th of June, 1911, assigned one month's salary, $225, to Professor Boyd "for services rendered as acting dean of the College of Engineering during the year's leave of absence of Dean Orton..."

Though he was acting dean for only a few months, James E. Boyd merits attention in the history of the College of Engineering. His academic credentials were good; he received a B. Sc. from Ohio State in 1891, and, after being assistant in physics at his alma mater 1891-95, he spent a year at Cornell and got an M. S. in 1896. At Ohio State he was assistant professor of physics 1896-1901, associate professor

of mathematics 1901-06, and, beginning in 1906,he headed the department of Mechanics. He had served as secretary of the Entrance Board. His comment on the lack of graduate degrees by some of his colleagues was "they made the science." "Jimmy Boyd," with his goatee,his stentorian voice, and his insistence that his students know the multiplication table at least through the 15's and that they sit straight in their chairs with feet on the floor, was a familiar and favorite professor of many generations of engineering students at Ohio State.

In meeting the 26th of March, 1909, the Board of Trustees adopted the report "concerning the Appointment of Deans with Outline of Powers and Duties" stemming from Dean Orton's suggestions and agreed to at a conference of the deans. It provided that:

> The deans of the several colleges and of the Graduate School shall constitute an advisory board to the President in matters pertaining to general University policy, and shall be appointed by the Trustees upon nomination by the President to serve during the pleasure of the Board...
>
> The deans shall cooperate with the President in carrying into effect the rules and orders of the Trustees, of the University Faculty, and of the President in the several colleges...
>
> The deans shall constitute an advisory council in matters pertaining to the annual budget, and in their respective colleges they shall advise with the President concerning new appointments and promotions in the teaching force.
>
> The dean shall be the presiding officer of his college faculty. In the University Faculty, his duties to be such as are provided for under the University Faculty rules.

According to the plan adopted, President Thompson made recommendations for the deanships, and the appointments were made by the Trustees at their meeting the 20th of May, 1909. Edward Orton, Jr. was appointed dean of the College of Engineering, effective the first of July, 1909. At the previous meeting the Trustees had granted Professor Orton leave of absence for 1909-1910, so the 22nd of June they officially appointed Prof. F. C.Caldwell--who had been acting dean by election of the College faculty during the previous year--as acting dean of the College of Engineering for the year ending the 30th of June, 1910.

For the first meeting of the 1910-1911 academic year, Dean Orton called the College of Engineering faculty to order. One of the actions of that meeting was the appointment of a committee to consider adoption of five-year courses in the College. The committee, chaired by Prof. F. H. Eno of the department of Civil Engineering, submitted and resubmitted its report, which the faculty considered and modified at a number of meetings. As finally adopted at the faculty meeting the 7th of February, 1911, the report was to change the degres awarded on completion of four years' work from the professional "Civil Engineer," and so on, to "Bachelor" of each professional curriculum, and so "to abolish the anomaly of designating as 'Engineer' a graduating senior." Additional provisions included plans for degrees in more than one professional branch on completion of additional work, for Arts-Engineering degrees, and for "a graduate school, an organic part of this College," in which, by taking advanced courses, the student might receive a degree as "master of the course in which the major work has been taken," and, after acceptable experience, including a thesis, the professional engineer degree. The report stated that:

> The sentiment of this College does not deem it wise, however, to require five years of all who graduate, but merely to furnish those students who care to avail themselves of it, the opportunity of an additional year's work.

It was decided that the plan should be published at once, effective in 1915, though students who might wish to take advantage of it earlier could do so. Nearly a year later, at the meeting of January 18, 1912, the Board of Trustees approved the new designations for undergraduate degrees.

In his report for the year 1910-11, Dean Orton stated that henceforth the four-year course would lead to the bachelor's degree, and the professional degree would be equivalent to a doctorate. He commented that, after a year's trial, the semester system seemed to be working satisfactorily, and that proposals and plans were continuing looking toward the establishment of an engineering experiment station.

Another item in Dean Orton's 1910-1911 report was that the course in Industrial Arts had been dropped and the degree withdrawn. This action had followed discussions in the College of Engineering faculty meeting of the 21st of March, 1911.

Professor C. W. Foulk of the department of Chemistry, chairman of the committee to study the subject, reported that, though letters from engineers, graduates in the course, and others had expressed satisfaction with the work, in "14 bearing years...the fruit has been six graduates," and such courses "produce a hybrid who is neither technically trained in any branch of engineering nor has that breadth of training that an arts college course in business administration would give."

In that University report for 1910-1911, Dean Denney of the College of Arts, Philosophy, and Science argued against grouping in the College of Engineering for administration the departments that gave instruction in science, even though their students might be largely engineers. He noted that for the year 1910-1911 his college had had more students than the College of Engineering "hitherto the leader."

Alumnus Ralph Mershon, M.E. 1890, had presented a plan of organization that, in essence, was adopted by the Trustees at their March 1911 meeting. Mershon proposed that each department of the University should be assigned to one of the colleges, under the immediate supervision of a dean, with questions of personnel and appropriations to be submitted by the heads of the departments to the dean who should submit them,with his recommendations, to the President.

By the new plan of organization, the financial budget for 1911-12 was organized by colleges; previously, departments had been simply listed alphabetically in the budget. The College of Engineering budget of $142,285 for salaries was the highest (except for the President's budget which included all maintenance) in a total salary budget of $484,522.50. Besides the engineering courses, it included the departments of Astronomy, Chemistry, Mathematics, and Physics. Since the department of Chemistry was administered through the College of Engineering, the salary of Dr.William McPherson, professor of chemistry and dean of the Graduate School, appeared in the College of Engineering budget. This anomaly continued until, in 1916-1917, the salaries of the deans were put in a separate "deans' budget."

The College of Engineering faculty meeting of the 4th of April 1911 considered

the report of a committee headed by Professor Lord on the condition and value of engineering experiment stations:

> The most extensive organization of the kind is at the University of Illinois where an amount of something like $75,000 annually is devoted to the expense of the Engineering Experiment Station.

The committee unanimously opined that such a station:

> Would be a very desirable thing from the standpoint of the manufacturing, mining, and technical interests of the State, and that the experience of those institutions having experiment stations has fully justified this conclusion.

In May, 1911, the College of Engineering faculty learned that the combination Arts-Engineering courses, having been agreed to by both colleges, were in force. Similar negotiations could be made with other arts colleges in Ohio. During 1911 the departments of the College of Engineering were proposing and discussing new graduate courses.

Suddenly the College of Engineering began to worry about declining enrollment. At the faculty meeting the 12th of December, 1911, Prof. C. W. Foulk, chairman of the Committee on the State of the College of Engineering, gave a preliminary report "on the welfare of the Engineering College." Attendance at the leading engineering schools of the Nation was lagging: "Almost without exception the maximum was reached in 1908, and since then there has been a falling off." However; the committee was "of the opinion that the falling off at Ohio State offers no symptoms for diagnosis," but:

> The present decrease in numbers should be viewed as a temporary relief from the past exhausting struggle to provide accommodation and instruction for a rapidly increasing attendance...Advantage should be taken of it to strengthen and deepen the work of the College, rather than to view the situation with alarm and begin a campaign for more students.

Prof. Ross C. Purdy of the department of Ceramic Engineering, "acting dean pro tem," and Secretary Coddington signed the minutes of the meeting of the 9th of January 1912. At this meeting the faculty went into a committee of the whole to consider a request by the Board of Trustees for information on outside remunerative work done by individual members of the faculty.

October 1, 1912, at the first faculty meeting of the academic year 1912-1913, Dean Orton made an address pointing out the blessings the faculty enjoyed. The four teachers who had had a year off for investigation, study and travel should share the enthusiasm and inspiration they had caught. There had been notable promotion in rank, with seven new professorships created. The University had "dealt kindly with the faculty in salaries," with 43 increases totaling $7,590, an average of $176 for each increase. Professors Bohannan and Hitchcock had been granted leave of absence for 1912-1913. (Professor Bohannan had found that he could not take advantage of the leave, however.) Hitchcock's place on the Robinson Fellowship committee had been filled by Prof. Horace Judd; to satisfy the Graduate Council, that committee had to make the requirements for a doctorate for the Robinson fellow as stiff as for other doctoral degrees of the University.

Though lagging enrollment in the College had been shrugged off, there were other things to worry about. The Committee on the State of the College had reported:

> 1. That the graduates of the College of Engineering are considered deficient by their employers and by each other in their ability to handle the English language...
>
> 2. That the work of the College of Engineering as an organization, and its professors as individuals, is as a rule not widely known in the country.
>
> 3. That opinion among alumni and employers is very strong that Ohio State University engineers are strong in the fundamental branches--mathematics, physics, chemistry, mechanics, and engineering drawing--but there is not a similary strong or unanimous opinion in favor of the teaching in the technical departments...

Dean Orton proposed that the faculty make the English of the engineers a special order for the regular meeting of the 5th of November, and invite instructors of the language departments to attend. He asked the committee to prepare a discussion on "Publicity for the College and Teaching Staff--desirable and undesirable."

He stated that the College was behind the times and derelict in its duty in not arranging for engineering lecture courses. And there was need for convenient department libraries, because:

> The students in engineering simply will not use books if they have to go to the General Library and make a search for what they want. The value of books at hand and books elsewhere varies inversely about as the cube of the distance.

The dean had told it as it was, and the faculty thanked him for his address.

On the 5th of November,1912, the committee on the teaching of English reported that the writers of about half of 50 letters received on the subject considered Ohio State engineering graduates as good as or better than other technical graduates in their use of language; about a third had no opinion; about one-fifth thought the Ohio State graduates were inferior in English, and "no doubt the opinion of a number of those best qualified to judge is unfavorable." The manager of a large electrical manufacturing company had written that:

> Our students have shown in a large measure a lack of knowledge in composition and proper English construction...made evident by their uniform inability to dictate correct, concise and grammatical letters, even when they have the aid of a first-class stenographer.

Suggestions for improving the situation totaled 23, including proposals for language examination that must be passed before admission, five to ten minutes of drill at various times for those who could not spell, withdrawing English credit from upper-classmen who showed marked deficiency, adding the study of logic in the junior year, a fourth-year course in writing engineering English, including specifications, and employing instructors familiar with technical writing.

A year later, at the November 1913 meeting, the faculty went into a committee of the whole to consider the teaching of English. The report of the committee of the whole, mimeographed and sent to each member of the faculty, included suggestions similar to the original 23. The subject continued to be discussed at later meetings. The faculty felt strongly on the subject. Once Professor Jimmy Boyd was heard to bark at a student, "Young man, you want to git all the English you can git." Professor Foulk's dictum, displayed for a number of years in the chemistry lecture hall, was:

> The English language is the most important scientific instrument at your disposal. Learn to use it with precision.

Faculty interest in the teaching of English bore fruit in the third quarter-century of the College of Engineering. Sada A. Harbarger, an arts graduate '06 from Ohio State with a master's from the University of Illinois, became instructor in English in 1919, and in the twenties and thirties was leader of a group teaching special courses for the engineering freshmen.

Publicity for the College of Engineering was considered at the meeting of the 3rd of December 1912. The committee admitted that the College of Engineering might not be widely known, but asserted:

> This College has in the past been emphatically a teaching college and has attained a gratifying proficiency in this respect. The publicity resulting from this fact is the very best type and we must continue to maintain and better our position.

Recommendations included more publications and lectures by faculty members--though finding the time to produce them was a problem--dignified advertising in technical journals, news releases on faculty activities, engineering extension courses, establishment of a university press, and participation in the work of technical and scientific societies.

Discussion of means of improving the work and reputation of the College continued from year to year. Engineering lectures were started with a talk in "Industrial Hygiene" in December 1913. Attendance at the lectures varied "from 25 to capacity," though the time set for them, at 4:10 on Friday afternoons, was a deterrent. The Trustees provided a little money for lecturers' expenses, and the experiment was considered relatively satisfactory. "Smoke Prevention" and "Munitions of War," two subjects in the 1915-1916 lecture series, suggest the state of the world before the United States entered the first world war.

In June 1911 the Board of Trustees, which had decided that University buildings should not be named for living persons, resolved to call the building used by the departments of Mechanical Engineering and Electrical Engineering the Robinson Laboratory.* At the meeting of June 10, 1912, the Trustees named the School of Mines building Lord Hall. The shops building, for which the contract was awarded in November 1915 at a contract price of $84,625, was officially named "Shops

*Professor Robinson had been awarded the D.Sc. degree by action of the Board of Trustees the 16th of December, 1896.

Building" when the Trustees got around to that in January 1917.

When it was time to choose the secretary of the Engineering faculty, at the meeting in June, 1913, the nominating committee declared that it could "find no more suitable person than the present incumbent," and that there ought to be some way/to recognize financially the secretary's work. Prof. E. F. Coddington was re-elected.

In the spring of 1914 a committee was appointed to investigate establishment of a general engineering curriculum, with at least 30 hours of electives, affording options for combining military science and engineering, the commercial side of engineering, or some other special line. A general engineering curriculum was adopted in the meeting the 8th of December 1914. At commencement in June 1915 the Bachelor of Engineering degree was conferred on Wilber Stout who, after being instructor in ceramics, became State Geologist of Ohio, and in 1931 received the professional Ceramic Engineer degree.

Optometry, a short course in the department of Physics, was authorized by the Trustees in August, 1914, and in August 1915 a four-year curriculum in the subject was approved.

In 1914 the report of a committee in favor of establishing a chapter of Tau Beta Pi, the engineering honorary fraternity, was laid on the table until students who desired to form a chapter should petition for it.

The Board of Trustees meeting of the 5th of April, 1904, authorized the University secretary to pay Miss Metta L. Seymour $5 per month out of appropriations for incidentals for services as stenographer for the dean of the College of Engineering. The 1905-06 budget of the College provided $180 for Miss Seymour, "stenographer (part time)." By 1909 the stipend of the College stenographer had gone up to $540 for the year. The stenographer authorized for the College at the Trustees meeting the 6th of August, 1913, was Lenora Glasgow who, during the next 30 years, as secretary and assistant to the dean of the College in such duties as keeping records, preparing schedules, figuring point-hour ratios, and generally being the advocate of the engineering students in the College office became one of the most widely known and respected members of the administrative staff.

In response to a communication from the Engineering Faculty for an organizational set-up for the Engineering Experiment Station, which was created by the Ohio Legislature in March 1913, the Trustees, in October 1913 directed President Thompson to prepare a plan for administration. The organization decided upon was that the dean should be Director, with an Advisory Council of six faculty members. The first Advisory Council appointments were made in December 1915. An appropriation of $1000 for the Station was made by the Board of Trustees in the fall of 1915, and a second $1000 became available in 1916.

Dean Orton requested leave of absence, without salary, for the year 1915-1916, effective the first of July, 1915. The Trustees granted this leave at the meeting of April 24, 1915, and appointed Professor Coddington, then secretary of the College, acting dean for the year. Also, the Trustees adopted a rule that in certain colleges there should be an assistant to the dean who should be secretary of the college. As assistant to the dean of the College of Engineering the Trustees appointed Prof. C.C. Morris of the department of Mathematics. Dean Orton announced these changes at the Engineering College faculty meeting the 11th of June 1915, and received felicitations that his year's leave would "be attended with pleasure and success in the work he may undertake."

With Acting Dean Coddington presiding, the College faculty, at the meeting the 5th of October 1915 learned that registration had about reached the maximum. War clouds were gathering, and students were registering for engineering education. A year later, in October 1916, the acting dean stated that enrollment in the College was greater than it had ever been. Registration in the College that year was 960.

President Thompson, at the meeting the 7th of November 1916, presented a request from the State Civil Service Commission for assistance from the Engineering College faculty in helping classify the civil service. The acting dean appointed a committee on the advisability of requiring a definite amount of practical engineering or commercial experience as prerequisite for a first degree from the College. In March, 1916, the Trustees, in response to a communication from Prof. A.S. Watts of the department of Ceramic Engineering, were in favor of allowing the

U. S. Bureau of Mines to locate an experiment Station in Lord Hall. That station operated for a number of years. Its location brought to the University George A. Bole who, in the twenties, became research professor of ceramic engineering in the Engineering Experiment Station.

The 8th of February 1916, President Thompson presented "for future consideration and action by the Trustees, a proposal to establish and maintain one or more research professorships." The Board of Trustees unanimously approved the principle. At the next meeting, in March 1916, the President recommended acceptance of the resignation of Dean Orton, who asked to be relieved from his duties because of the increasing pressure of his business responsibilities and his wish to do scientific and industrial research rather than teaching or administration. In his resignation letter the dean offered to consider research in the Engineering Experiment Station or elsewhere at the University. The Trustees at once appointed Mr. Orton research professor of ceramic engineering, part time.

An item of $5,000 for salary of the dean of the College of Engineering was in the budget for 1916-1917, but no appointment was made. Professor Coddington remained acting dean, and that arrangement continued until a dean was named to take office the first of July 1920.

In September 1916, Dr. William J. McCaughey was promoted by the Trustees from assistant professor to professor of mineralogy, the increase in salary to be paid from the amount appropriated for the salary of the dean of the College of Engineering. In meeting the 9th of January 1917 the Trustees canceled $2,500 of the amount appropriated for the dean's salary. The 7th of April 1917 they appropriated $250 to compensate Professor Coddington for his services as acting dean for the year 1916-1917. He received a like amount for 1917-1918. In the 1918-1919 financial budget, and in the budget for 1919-1920 the supplement to Professor Coddington's salary as professor of mechanics for acting as dean was $500.

At the College faculty meeting of December 1916, Professor Orton reported on the National Defense Act setting up the Reserve Officers' Training Corps. A motion was carried to authorize the increased amount of military credit required for students electing the senior division of the R.O.T.C. A University action of 1916 was to request the War Department to extend the assignment of Maj. G. L. Converse who had already been commandant of cadets for 16 years. This veteran fighter wore a black patch over one eye, but the other eye could stare down a cadet whose excuse for missing drill was poor. However "Commie" had a human side. An engineering student has confessed that once when he cut classes to go coon hunting up in Delaware County, he approached the commandant ready to blurt out a fabricated excuse, but when that single eye was turned upon him he couldn't tell a lie. He calmly told the truth. "How was the coon hunting?" inquired the major as he signed an excuse slip.

Enrollment in the College for the second semester 1917 was down, but the faculty meeting of March 6, 1917, was told the shrinkage was normal, and published reports to the contrary were false. Professor Foulk presented a resolution offering the President of the United States the services of the College of Engineering for research in national defense, and this resolution was approved and adopted by the Board of Trustees at the April meeting.

With the United States in the war, the 29th of May 1917 Acting Dean Coddington told the faculty of a meeting at Case School of Applied Science to discuss services the engineering colleges of Ohio could furnish the United States in the crisis. He appointed a committee to consider modifications of courses to meet the military emergency, to consider military camps, and look into the plan to divide the school year into four quarters to speed up graduation of students, enabling some, at least, to receive their degrees before being drafted.

Throughout the school year 1917-18, the campus crowd contained cadets in the Aviation Ground School which was located on the campus. The cadets lived in a one-story barracks building that filled the "quadrangle" east of Robinson Laboratory.

At the meeting of October 2, 1917, Professor Caldwell moved that "it is the sense of this faculty that a member of the faculty should act as secretary of the faculty." Assistant Professor Robert Meiklejohn of the department of Engineering Drawing was elected "permanent secretary."

In November 1917 the committee on modification of courses to meet the military emergency reported that the University should operate on the four-quarter plan instead of in semesters, each course being repeated in as many of the four quarters as the demand might warrant, and that in view of the war this change should take effect in 1918. Among the reasons cited was that "the intrinsic value of the four-quarter system warrants its permanent adoption" for "the plant and equipment of the University would be more efficiently used."

To increase the number of qualified students, the committee on Military Relations advocated publicity regarding the College and its work. The committee report, considered at the meeting the 5th of December 1917, mentioned such possible courses as military survey in civil engineering, metallurgy to train inspectors of steel for the United States, and design of "Camouflage." The War Department ruling that men subject to the draft would no longer be permitted to volunteer in the service for which they were specially fitted was causing withdrawals daily from the College of Engineering. Accordingly, the faculty resolved that the proper authorities should be requested to see what provision could be made to have students of the College who enlisted or were drafted assigned to the technical service for which they were especially fitted.

In January 1918 Acting Dean Coddington explained the war regulations pertaining to the Engineering Enlisted Reserve Corps and the Signal Enlisted Reserve Corps. A committee on a proposed course for training technical school students for service in the Radio Division Signal Corps of the Army reported that, with modifications, such a course could be accepted as credit toward graduation.

An additional report of the Military Relations Committee mentioned the obligation of the Engineering College to speed up the work of preparing its students. Accordingly, subject to to approval of the University Faculty and Trustees, the

senior work of the College would begin the 24th of June 1918, and proceed so the class could be graduated about them middle of March 1919. The juniors should be called together and informed of the change and given questionnaries to fill out.

Enrollment for the second semester 1917-1918 was down to 693 students. A progress report of the Military Relations Committee at the meeting of the 3rd of May 1918 advocated that in the war emergency, the curricula should be reconstructed to allow granting of a certificate degree at the end of three years, and new curricula should be put into operation in September 1918.

At meetings in September and October, 1918, the faculty learned of policies regarding the Student Army Training Corps (S.A.T.C.) then in operation. The University was willing to comply, even to permitting students to enter the S.A.T.C. for limited or active service in technical courses under the charge of the College of Engineering in advance of the freshman year. That fall, being a male student at the University was almost synonymous with being in the service as a member of the S.A.T.C. As in military camps everywhere, there were many cases of Spanish influenza, the epidemic that swept the world that fall, among the S.A.T.C. enrolees. Because of the S.A.T.C. enrollment the first semester of 1918-1919 was 1189. Many of them had no interest in academic work.

After the Armistice the 11th of November 1918, Dean Coddington explained the academic situation relative to the demobilization of the S.A.T.C. The arrangements should "occasion the least trouble in educational work of those students who propose to continue in the University."

Academic interests intended to improve the quality of the educational opportunities offered quickly reappeared. The State of the College Committee was going to study a Carnegie Foundation report on Engineering Education. Though there was no G.I. bill of rights, demobilized veterans were eager to go to college/ --beginning in the fall of 1919. The second semester 1918-1919, enrollment in the College was 686.

In the spring of 1919, committees of the Engineering College faculty were investigating the relations of the College to vocational extension education, as well as such items as entrance requirements in foreign languages. In March 1919, "to bring about closer contact between the College and other technical

and educational bodies," the dean was requested, as soon as practicable, to secure institutional membership for the College in the Society for the Promotion of Engineering Education (S.P.E.E.). In April the faculty resolved that the President and Board of Trustees should secure an apporpriation of $15,000 for 1919-1920 and $25,000 for 1920-1921 for the work of the Engineering Experiment Station, and that the Station Advisory Council should direct engineering extension until it should be otherwise provided for. At the May 6, 1919 meeting, a committee was appointed to consider "Commercial Engineering."

Larger numbers of returned veterans entered college in the fall of 1919. In meeting the 23rd of September, 1919, the faculty of the College of Engineering resolved that "The faculty of the College wishes to place on record its high appreciation of the dean's office during the unprecedented registration of 1919." Enrollment in the College of Engineering the first semester 1919-1920 was 1423.

After "about 15 meetings" the Committee on the State of the College recommended That the College continue to cooperate with S.P.E.E. in experiments with psychological tests for students... That orientation lectures be given to all freshmen of the College of Engineering during the year, with attendance required but not necessary for credit...That the point-system of grading be considered...That a seminar on teaching methods be held for all instructors.

Many whose education had been interrupted by the war were completing college. At the June 1920 Commencement, the College of Engineering awarded degrees to 152.

With a return to "normalcy" the College of Engineering faculty and the University administration were ready to end the "acting" situation in the College. The candidate who was decided upon for dean was Professor E. A. Hitchcock who had started up the academic ladder in the department of Mechanical Engineering at the beginning of 1893, had gone on leave of absence in 1912, and who, after spending the year's leave in professional work, had resigned

in 1913 despite President Thompson's threat "I've a mind to knock your block off." Mr. Hitchcock, in his autobiography, My 50 Years in Engineering, explained that his selection may have been due to a feeling on the part of the faculty that "we had better choose somebody who knows us." The date set for his assumption of the duties of dean was the first of July 1920.

THE FIRST CENTURY OF THE COLLEGE OF ENGINEERING AT THE OHIO STATE UNIVERSITY

III 1920-1945

President William Oxley Thompson, in his annual report for 1920-21, headed one section "Election of Embury A. Hitchcock as Dean of the College of Engineering." In his praise of the new chief executive of the College, President Thompson threw a bouquet to the outgoing acting dean:

> ....From April 24, 1915, until the appointment of Dean Hitchcock, Prof. E. F. Coddington of the Department of Mechanics had been serving as Acting Dean of the College of Engineering. His services in this office were of the most painstaking character and entitle him to high appreciation for the successful manner in which he administered the College.
>
> For some time the search for a Dean of the College was interrupted, due to the war conditions, but in 1920 there came a unanimity of choice which was pleasing to everyone and as a result Embury A. Hitchcock was elected Dean of the College. Professor Hitchcock received the degree of Mechanical Engineer from Cornell in 1890. After some practical experience, he was in 1893 elected assistant in Mechanical Engineering at The Ohio State University and passed through the several ranks, becoming Professor of Experimental Engineering in 1901. In 1913 he resigned his professorship in order to enter an attractive field of commercial service. His return to the University was most cordially welcomed by his former colleagues. His first year of experience assures the University of the wisdom of the choice and gives full promise for a successful administration...

Mr. Hitchcock's tenure as Dean began the first of July, 1920, soon after his fifty-fourth birthday. It was to last through the first two-thirds of the third quarter century of the College, until his retirement the first of September, 1936, at the age of seventy. In his autobiography, My Fifty Years in Engineering, published in 1939, Dean Emeritus Hitchcock explained why he was offered the deanship and why he accepted it:

> ...The Engineer who devotes his life to education has the satisfaction of seeing his desire to improve the world accomplished through the efforts of his students. I had tried both teaching and practice, and something about teaching had appealed very strongly to me.
>
> It was not that I liked engineering practice less, but that I liked teaching more.

> Accordingly, in the spring of 1920, it was with interest that I received intimations from a number of my friends at The Ohio State University that there might be an opportunity to return to the campus...The College of Engineering was looking for a dean, and, somewhat to my surprise, I learned that I was being considered.
>
> You know how engineers are: inclined to set up specifications for the performance of any task. That's the way they get their work done. The faculty committee to select a dean had set up standards for the man to be appointed; he must be within certain age limits, have certain training and experience, possess the right kind of personal qualifications and mannerisms. Even his family had to be considered. The composite was a regular paragon. After this theoretical person had been set up, the job was to find him in the flesh.
>
> Then, so I was told, someone on the faculty exclaimed, "We'd better get a man who knows us."
>
> I seemed to belong in the class of men who knew them; at least they thought I did. Naturally, I was pleased at such an indication of the good wishes of my old colleagues....When all the arrangements were made, I resigned my job with the Bailey Meter Company--I hated to leave there, too -- and was back in Columbus in time to make a study of the college activities before the school opened in the fall.

There is a curious mistake in the index of the proceedings of the Board of Trustees of the University covering Dean Hitchcock's appointment. "Mrs. E. A. Hitchcock" is listed as being appointed assistant in English. The real Mrs. Hitchcock was Mary Alice Hitchcock, not related, who taught many sections of English for engineering students in the group organized by Sada A. Harbarger, and cooperated in the "demonstration interviews" arranged to show the benefit of personal acquaintance between student and instructor.

Dean Hitchcock was a person who "identified" with students. References in the reports show the esteem in which he was held by them. An engineering graduate who became a consulting engineer and faculty member once stated, "When you talk with Dean Hitchcock, you know he has your interest at heart." Junior Dean Turnbull, when he had taken over management of the "Survey of Engineering" course for freshman students, described their behavior as "polite" to the professors and engineers who appeared on the program, but when Hitchcock was the speaker "They just raised the roof."

Presiding at the faculty meeting the 28th of September, 1920, the Dean "presented his annual communication," according to the College Record. The address was ordered printed and distributed to the faculty members. He stated that his views were a synthesis of opinions formed during his teaching and in his seven years in industry in association "not only with graduates of this and other universities but also with men of affairs, men of large ideas who never had the advantage of a university education."

In his contacts with executives of business and industry, "the great value of English to the Engineer was driven home strongly." He had become a strong advocate of more English in the engineering course, particularly for upperclassmen:

> English to be of the greatest value should come in the junior or senior years, the senior year preferably...If additional English is not possible, then part of that now in the freshman year should be transferred to the junior or senior year.

He was against forcing engineering students to study a foreign language: "Those for whom modern language is 'impossible,' can substitute other subjects of a liberal character."

He was strong for the "fundamentals" and approved of that part of the curriculum, though "Our weakness, however, is in the manner in which it is given." The whole program should be in the interest of the students:

> Since it is the aim of this college to turn out just as good engineers as we can, not mechanics, tradesmen, etc., we must first be sure of our timber; then see that it goes in the right direction. To accomplish this result,a series of lectures should be given to the freshmen engineers at the outset of the courses and continued either through one semester or both....This University is run for our students. He is our raw material.. It is our business to so operate this plant that we will turn out the best possible finished product.....
>
> Next in importance to student education is our duty to the state...Another important factor is our duty, as well as our desire, to serve our respective professions in so far as we are able to do so. An engineering teacher is simply fooling himself if he believes he can be efficient and not be in constant touch with the engineering world.

The location of the College, in Columbus, with construction work and manufacturing readily at hand for observation was a matter for congratulation,

and, "If we are not taking advantage of them and our students are not, it is our fault."

His industrial experience had made him sensitive to the need to use facilities intensively:

> During the past summer in visiting the different departments of this College, the valuable equipment standing idle and the many laboratories deserted was more noticeable to me than ever before on account of the different conditions with which I have been surrounded during the past few years...All of us engineers must recognize that our duty to the state calls for greater use of these facilities, be it through the four term plan or the engineering experiment station. Upon a more continuous use of this equipment I am sure we are agreed, and, therefore, we should suggest steps be taken which would lead to a higher load factor here.

In 1916 the College, under the leadership of Professor D. J. Demorest, had participated in a Congress of Human Engineering. Dean Hitchcock called "human engineering" a live issue:

> The most valuable engineer of the present and of the future is the one who recognizes the importance of the human factor in our activities, knows how to deal and deal justly, knows how to be a leader and not a driver, and appeals to the manhood of the worker, be this worker a college graduate or a mechanic.

He closed by expressing his appreciation of "your invitation that I again join your family circle--for it is truly that--all workers and helpers in a most worthy cause."

Enrollment in the College in September 1920 was 1423, of whom 524 were sophomores, 245 juniors, and 172 seniors. The entering class was 482. Electrical Engineering was represented by 341 (128 freshmen), Mechanical Engineering by 339 (103 freshmen), Civil Engineering by 208 (66 freshmen), and Chemical Engineering by 196 (63 of them first year men.)

Dean Hitchcock observed in his report for his first year in the deanship, that the enrollment reflected conditions following the war, and opined that projecting the "normal" rate of increase would bring the enrollment for 1921-22 to about 1600. He was disappointed; enrollment in the fall of 1921 was only 1489. He noted that there were many transfer students, and expressed approval of students' taking the first year or two of the course at colleges near their homes.

Always optimistic, Dean Hitchcock projected enrollment figures in his second report to a total of about 1680 for the year 1922-23. Actually, the total in the fall of 1922 was only 1373, only 313 freshmen, the smallest entering class of the twenties. He became wary, and in the report for 1924-25 stated: "Continuing the general direction of the growth curve, we find that in 1930 the enrollment should be 1600 students." There were 1632 students in the fall of 1929 and 1733 in the fall of 1930, and then there was a drop in the depression.

Student activities received much encouragement from the College administration. The magazine, The Ohio State Engineer, which had started just before the first world war curtailed activities, became an outlet for student energies. Gamma of Ohio chapter of Tau Beta Pi was organized in 1920, and a number of alumni were elected to membership.

Talks to the freshmen students to inform them about the College and the engineering profession were given by the Dean and department chairmen. Dean Hitchcock's report gave special approbation to "Human Engineering" by R. H. Sweetser of the Columbus Iron and Steel Company, and "Ohio State Traditions" by Col. Edward Orton, Jr. Attendance was good, though not compulsory.

The Engineering Experiment Station organization was continued, though funds for operation were meager, and the Dean reported that bulletins on research in the College would be titled "Engineering Experiment Station Circulars."

During 1920-21 and again in 1921-22, Prof. Clyde T. Morris was on leave of absence from the Department of Civil Engineering to serve as chief engineer of design and construction of the Ohio Stadium. His classes were taught by J. R. Burkey, C.E. '08, who was later to have a distinguished career in the Bridge Bureau of the Ohio Department of Highways. The Dean complimented all the faculty members for their faithful work, "difficult though it may have been due to the large size of many classes."

Dean Hitchcock's interest in the students was particularly evident in his report for 1921-22. Interviews were conducted to explore the students' reasons for choosing engineering, the basis for difficulties and failures, and their attitude toward education. Advice of relatives and friends and interest in machinery, particularly automobiles, were the most common reasons for selecting technical courses. The endeavor was "to satisfy ourselves that the student is in his natural field...and point out the way through the freshman lectures and personal interviews so that he makes no mistake and that we are not using our energies upon impossible material." He noted that many students "are following engineering because of their love for the work and their desire to render service and to be of value to their community."

Esprit de corps was growing among the students:

> During the past year we have noticed the development of a closer bond of fellowship among the various engineering groups of our student body, a product, no doubt, of the recently organized Engineers' Student Council. This organization staged a number of noteworthy events, prominent among which were "The Round-up," "The Engineers' Dance" (a social function, "The Engineering Exhibit," (an engineering exhibition, aided by local industries), an active campaign during the period of final examinations in support of the Honor System, and a demonstration in honor of the President.

In many of his reports, Dean Hitchcock praised the Engineers' Council, composed of two representatives, a junior and a senior, from each student engineering organization, meeting regularly twice a mohth,"and the dean very seldom lets anything interfere with his presence at such meetings."

During 1922 the Riehle 500,000-lb column testing machine was received; it had to be stored until the Engineering Experiment Station building was ready to receive it. An addition was being built to Brown Hall. The Society for the Promotion of Engineering Education (S.P.E.E, now A.S.E.E, standing for American Society for Engineering Education) met at the University of Illinois, with 60 colleges represented, and 11 Ohio State faculty members attended. The Dean concluded his 1922 report to the President:

> I do not believe that there is anywhere a body of engineering teachers more conscientious, more untiring in their efforts, more devoted to their cause, more thoughtful of their students' welfare, and more interested in their future achievements than your engineering faculty.

"Elements of Engineering" or "Survey of Engineering", the weekly lectures to freshman students, became a required course in the fall of 1922. That was the first year the quarter system was in effect, replacing the semester system; the change over required an enormous amount of schedule readjustment. TheOhio Stadium was completed in the fall of 1922, and to prepare it for the Michigan game students joined faculty members in cleaning up the debris.

Reporting on the Survey of Engineering course, Dean Hitchcock stated:

> The results obtained are proving most conclusively the great value of this method of contact with the freshmen...It is at these lectures that much stress is placed upon the value of the students' subjects and special emphasis is given to English, since in the mind of the students this subject is far removed from the field of engineering.
>
> Lectures to the freshmen varied greatly. They began by stressing the importance of the work given in the freshman year, pointing out its relation to the subsequent work in their engineering courses. ...Several lectures upon the important subject, "How to Study," were acknowledged by many students to be most helpful to them. A series of talks upon the "History of the Engineering College and of some of her Great Men" brought University traditions close to these students right at the beginning of their University career. A series of talks by heads of the several degree-giving departments relating to their respective fields gave the student a clearer view of the breadth of the engineering field...R. H. Sweetser of the Columbus Iron & Steel Company gave a talk on "Human Engineering," Col. Edward Orton, Jr., spoke upon "The Engineer as a Citizen," and Prof. J. V. Denney had the undivided attention of this class when he talked upon "Educational Values."
>
> Under direction of a college lecture committee of representatives of the college faculty and Students' Engineering Council, a series of lectures were given under the caption "Broaden Out, Engineers." ...Maximum attendance was about 650. Lectures included Prof. G. W. Rightmire on "Patents," C. F. Kettering on "The Engineer of Today and Some of his Works."...

Transition to the four-quarter plan was reported as smooth. The University broadcasting station, located in the aviation building, went into operation in the early part of the academic year 1922-23. Completion of the west wing of Brown Hall gave relief to the departments of Architecture and Engineering Drawing, but Civil Engineering was still cramped and found temporary quarters for its road materials laboratory in the cattle barn.

Dean Hitchcock's and President Thompson's annual reports were very much boiled down versions of the activities of committees and faculty meetings of the College of Engineering. It took a lot of machinery to establish policies and carry them into effect. The College of Engineering record praised the work of Acting Dean E. F. Coddington:

> The Faculty desires to place on record its high appreciation of Professor Coddington's service as Acting Dean, instructor, and investigator. To him the ultimate welfare of the student was paramount, and his devotion to the accomplishment of this end was of a very high order. He was loyal to his Faculty and took a deep personal interest in the work of the several departments under his jurisdiction.

At the Engineering College Faculty meeting the 7th of December, Prof. W. A. Knight of Industrial Arts had proposed a drastic change in operation, including adoption of the cooperative plan of education, incident to going over to the four-quarter plan:

to

1. That the year be divided in/four quarters of 12 weeks each, with one weeks intermission between quarters.
2. That but one-fourth of the prospective number of students for the year be admitted in any one quarter.
3. That cooperative work be established with the industries.
4. That to facilitate such cooperation, students be required to go into the industries at least one quarter in each year.

These recommendations were reported out by the Curricula Committee without comment. The consensus of the faculty was that under the four-quarter system the work of the College would normally be three quarters of academic work, and, as worded by Prof. C. W. Foulk of the department of Chemistry, "the work of one of the quarters--presumably the summer quarter--may consist of work essentially different from that of the other three."

More English for the engineering students was not just talk. Two courses, each three credit hours, were approved, "Advanced English for Engineers," to be taught by Miss S. A. Harbarger, in the fall of 1920, open to juniors and seniors. Under the quarter system, English courses 410, 411, and 412, each three hours, were scheduled throughout the freshman year for Engineering students, and Miss Harbarger's course became English 419, open to juniors and seniors, with such introductions to professional work as use of a dictating machine. The group of

instructors in English for freshman engineers, working with Miss Harbarger in the fall of 1922, included Mrs. Mary A. Hitchcock, Miss Mary Ross, and John Merrill Weed, an Arts College graduate'21 with considerable engineering experience.

It took machinery to get the point-hour system operating. The first proposals were quite complicated. Weights were to be

M (for merit)	1.6 points per credit hour (This grade,now A, is 4 points)
G (for good)	1.3 points per credit hour (Now B, 3 points)
A (average)	1.0 point per credit hour (now C, 2 points)
P (pass)	.7 point per credit hour (Now D, 1 point)
C (condition)	.4 point, with .3 additional points when removed.

And the total number of points required for graduation was not to be less than 90 per cent of the total number of hours passed. A student receiving less than points 70 per cent of the number of credit hours for which he was registered was to be placed on probation. A large number of meetings discussed the unfairness of making the point-hour system apply to students who had entered before the system went into effect. It became mandatory for those entering after the spring semester of 1922.

Reserve Officers Training Courses of a technical nature were desired by the Engineering College Faculty. In the fall of 1921 Dean Hitchcock announced that the Signal Corps R.O.T.C. was established and electrical engineering students could take courses. The officer in charge, Capt. James A. Code, reported that communication equipment worth half a million dollars would be available, much of it stored until more room was available for the department of Electrical Engineering. (At one time the R.O.T.C. list included, besides Captain Code, Major Walker of the Infantry and Captain Trott of the Cavalry.)

Many meetings of the Engineering College faculty discussed the handling of the professional degrees, Ceramic Engineer, for example. Holders of bachelors' degrees might be invited, or reminded by some departments to apply and submit theses for this recognition of professionalism. The professional degree could not be a graduate degree, for that would require residence in the University for

the year in which the degree was received. Some wanted to make it equivalent to a doctorate; some departments wanted to abolish it. There was some talk that it should be an "extenuation" degree. At a number of meetings the requirement that the recipient of a professional degree should hold a bachelor's degree in one of the engineering branches from Ohio State was waived; for example, Prof. John C. Prior, of the department of Civil Engineering, a graduate of Denison University, received the Civil Engineer degree in 1929. It was decided that a holder of one professional degree might receive another in a different field; for example, Edward Orton, Jr., E.M.'84, received the Ceramic Engineer degree in 1931.

From time to time the question of making the engineering course cover five years would come up. Dean Hitchcock reported to the faculty in May 1922 that a meeting of deans of Mid-Western universities had favored:

> An advance in engineering education to provide five years of college training to enable engineering students to take positions among creative leaders.
> Remodeling the four-year program, substituting humanistic and fundamental subjects.
> Adding a fifth year of advanced work, mostly or wholly technical
> Granting a bachelor's degree for the first four years, the fifth year to lead to an advanced degree in engineering.

These proposals were referred to a committee consisting of Professors Demorest, Nold, Caldwell, Magruder, and Sherman, and the committee recommended that another committee consider expansion of the present four-year curricula into five-year curricula. Another recommendation was that "so far as possible the curricula in the different branches be sufficiently uniform to permit students to defer the final choice of specialty at least to the end of the second year."

At the Engineering College Faculty meeting of October 1922 Dean Hitchcock reported a number of activities:

> Adoption of a point system of grading
> Revision and adoption of all curricula for the four-quarter plan
> Formation of an Ohio State Section of S.P.E.E.
> Policy of repeating courses each quarter, subject to demand and resources
> Appointment of a committee on electrical communication
> Adoption of the committee report recommending further consideration of five-year courses

He had held a conference with 74 seniors at commencement time for discussion of English and other subjects. The results included:

> Three seniors did not intend to continue in engineering, but would take the same course if they had it to do over again.
> Eight would not have taken the course if they had known, and "these men were in the wrong row."
> Most difficult freshman subjects: language 28, chemistry 25, English 9.
> Most difficult sophomore subjects: physics 16, mathematics 11, descriptive geometry 11, chemistry 5.
> Recommendations: 10 wanted more technical courses, 37 more liberal ones
> To continue schooling for 5 years if present course had been extended to that length with more liberal studies: 48 said yes 20 said no, and 3 would "like to."
> Present course satisfactory? Too few hours 8, too many 15, rest yes.
> How much English? Two years or more said 55 seniors or nearly 75 per cent of the group. The previous year 60 per cent had voted for more.

His comment was "We learn from the above that a large majority of seniors have some appreciation of the value of a more liberal education, and especially of English."

At the meeting of the S.P.E.E. the topic had been "how to teach." To that he would add, "What to teach and how to improve in our teaching." Then he touched on the complaint that the State University, in taking all high school graduates, did not get the best material:

> The true test of an institution of this kind is the quality of its graduates and how they measure up in the world years afterward regardless of their preparation and standing at the time of their entrance. Is it any credit to an instructor to take a class of merit high school men and turn out merit men from the University? I think not, for they would probably be merit men in spite of the instructor. The true test is to take average men and turn them out so that they will measure up to the selected few. The most difficult task successfully performed always brings the greatest satisfaction. The instructional force of this college has no need to waver or become panicky over conditions upon which we are entering or which seem to be ahead of us. As our numbers increase I believe we will meet the situation the very best we possibly can, and if the quality of our raw material, on the average, is inferior due to the position taken by other institutions, I am sure we will meet that condition also, aiming always to turn out the best possible finished product.

Professor Robert Meiklejohn of Engineering Drawing, at the meeting the 10th of October, 1922, asked leave for the year of his duties as secretary of the College. The acting secretary, unanimously elected, was Professor William D. Turnbull, also of the department of Engineering Drawing.

Professor Meiklejohn, known to many students as "Uncle Bob," was long a popular member of the faculty in Engineering Drawing, and served as acting chairman of that department for a time after the retirement, in 1942, of Professor Thomas E. French. In January 1925 he resigned as secretary of the College of Engineering, and Professor Turnbull dropped "acting" from his title as Secretary.

William Davis Turnbull, a native of Ironton, C. E. graduate 1908, joined the department of Engineering Drawing in 1910 and advanced through the grades to professor in 1923. He became, in 1928, the first Junior Dean of the College of Engineering. Because of his wit in presentation and his ability in sketching, his lectures were known as "painless drawing." A feature of many of the get-togethers known as the Engineers' Round-up was a humorous debate between Turnbull and Professor C. E. Sherman of the department of Civil Engineering. Sherman, who wore a goatee, might refer to himself as a plain-spoken engineer, and describe Turnbull, who was bald, as "a polished orator." In reply, Turnbull would assume an air of injury: "I regret that my opponent has seen fit to refer tom my personal appearance. Now I call you to witness that, while baldness is an affliction sent from Heaven, whiskers are a man's own fault."

General Engineering, the curriculum leading to the degree Bachelor of Engineering, was withdrawn by action of the Engineering College Faculty at the June meeting in 1921, with the proviso that students already enrolled in that course might continue and receive their degrees, but no student was allowed to enter or transfer to General Engineeringafter that date.

In the spring of 1923, on the recommendation of Entrance Board Secretary B. L. Stradley, later Dean of the College of Arts and University Vice-President, the College approved registration in the College of Engineering of students with an entrance condition in foreign language, previously required to register in the College of Arts and Sciences until their conditions were removed.

Another action of the College Faculty in the spring of 1923 was establishment

of the curriculum in Engineering Physics. Professor Alpheus W. Smith asked the establishment of such a course on these grounds:

I. There has been a persistent demand from industrial laboratories for students with this kind of training.
II. The fixed requirements of the College of Arts preclude the development of such a curriculum in that college.
III. The courses included in this curriculum are already established and are now offered either in the College of Engineering or in the Graduate School.
IV. This curriculum provides four years of mathematics, including mechanics; three years of physics; at least two years of chemistry, and a limited number of technical subjects.
V. Similar curricula are now offered at M.I.T., Case, and the University of Illinois.

The first year in Engineering Physics was made the same as the first year in other curricula of the College of Engineering, and 214 quarter hours of credit were required for graduation, exclusive of military science, physical education, and hygiene. The degree was first established as Bachelor of Science in Physics, later changed to Bachelor ~~of Science in~~ of Engineering Physics, and later still back to Bachelor of Science.

In June 1923 a committee consisting of heads of departments in the College of Engineering addressed a letter to Prof. J. V. Denney, chairman of the department of English:

> To express to you our appreciation of the work done in your department in the instruction of engineering students both in freshman English and in English 419 given to our fourth-year engineering students under the direction of Miss Sada A. Harbarger. We, therefore, hope that such recognition of her work in your department can be given to her such as will assure the retention of her services in the University for the benefit of students in this college...Her leaving for other fields, of which there is now a possibility, would be a distinct loss to this University.
>
> In order that her work be made more effective and proper dignity be given to it, may we be permitted to recommend that she be given the title of assistant professor and a seat in the Engineering Faculty.

More than a year later, the 7th of October 1924, Assistant Professors Harbarger, Jacklin, Stinson, and Terwilliger "sat with the faculty for the first time."

Committees of the College of Engineering in the fall of 1923 included one for study of the proposed five-year curriculum. A special committee on "social or civic engineering," under the chairmanship of Prof. C. A. Norman of the department of Mechanical Engineering, reported a great demand for engineers with understanding of human, social, and economic interests; recommended provision in the engineering curricula for such courses as physiology, industrial hygiene, psychology, economics, history of industrialism, and art appreciation; and recommended putting off training of specialists to a fifth year of study.

At a special meeting of the College Faculty the 22nd of January, 1924, Professor Magruder reported that, "on the contingency that the engineering colleges of the Middle West will act concurrently in changing their curricula from four years to five years," the committee recommends:

> First, that it is th sense of the committee that students in colleges of engineering should spend five years of study to earn an engineering degree...
>
> Second, that some degree other than an engineering degree should be given on the satisfactory completion of four years of the prescribed work.
>
> Third, that if the proposed five-year length of curriculum for an engineering degree is adopted, the new curricula should be made up of our present courses of study so rearranged as not to include materially more technical work, but to include more liberal studies and those of a broadening character, and arranged, so far as may be possible, that the student will reach a somewhat completed line of study at the end of each year of work....

This report was laid on the table.

Broadening was already at work. The proposal for Mechanical Engineering 713, adopted at the meeting the 5th of February 1924 made it a three-hour course in Industrial Engineering described as

> A series of lectures on the history of industrialism, art appreciation, personnel psychology, public health and sanitation, and certain other subjects for engineering students who are about to graduate.

The object of the course was "To try to open the minds of the young men who are about to graduate to some of the important things to which they should give attention as graduates."The lecturers would include Professors G. W. Knight of Political Science, Ralph Fanning of Fine Arts, H.E. Burtt of Psychology, and E. R. Hayhurst of Public Health.

The Faculty of Engineering, at the meeting the 3rd of June, 1924, approved the report of the Committee on Industrial Engineering, with instructions to put that curriculum into effect in October 1925.

Dean Hitchcock in his reports commended the Society for the Promotion of Engineering Education for its study of what should be taught and how, then being conducted by William E. Wickenden, later to become president of Case Institute of Technology. Ohio State, through the efforts of Miss Harbarger, had more members of S.P.E.E. than any other institution. In his report for 1923-24 the Dean stated that the Wickenden study "will settle many questions and guide us in future actions." He noted that five members of the Ohio State staff had attended the S.P.E.E. meeting at Boulder, Colorado, in June, 1924. The Dean himself had not been at the Colorado meeting; he had attended the London World Power Conference as a representative of the Appalachian Power Company, an activity that had "necessitated an absence from University duties of about five weeks."

Returning from the Colorado S.P.E.E. meeting, Prof. F. W. Ives, Agricultural Engineering, had been killed in a train wreck.

President Thompson, in his report for the year ending the 30th of June, 1925, suggested a somewhat skeptical attitude toward the flurry about education of engineers. His comments (italics by the writer of this history) were:

> Competent authorities have said that by 1930 there will be a great shortage in the number of men trained in engineering education. Estimates as to the number of men needed at that time may not be accurate or reliable, but they all point toward the fact that the supply will not be equal to the demand. Engineering education has undergone a considerable amount of discussion since the war period and there seems to be a recurrence to the theory in vogue 25 years ago when men believed that a college education in engineering as in many other subjects should result in the immediate preparation of a graduate for a particular place in the world's markets. A few years later we were told that the foundation courses and the subjects lying at the basis of engineering needed more attention and increasing emphasis. The educators seem to overlook that the average man with a college education can learn something after he leaves college. This is an important discovery to a great many people. In it, however, lies the hope that thoroughly trained engineers will find an important and increasing place in a highly organized society. The tendency to substitute some elementary and some more or less unrelated study in economics or some alleged cultural subject will probably produce an inferior engineer and a citizen whose liberal culture will not quite meet the demands either of the technical or the liberal field of activities. An engineer first of all is a man severely trained in exact sciences like mathematics and the application of mathematics as in physics and electricity to the constructive activities of business. No amount of generalization will ever serve as a substitute for these exacting requirements..Few professions are so

> insistent in their exactions as the engineering profession. Mere average men, therefore, have a small place in a profession of such high and exacting requirements. The recognition of this fact limits the number of students who secure an engineering education and at the same time makes a strong call upon young men who are willing to assume the responsibilities of life....

In his report for 1924-25, Dean Hitchcock noted that Prof. F. H. Eno of the department of Civil Engineering was on leave from teaching (though still looking after his thesis work) as director of the Ohio Road Sub-soils research, in cooperation with the U. S. Bureau of Public Roads and the Ohio Department of Highways. Professor John C. Prior was teaching the classes in water supply, sanitary engineering, and highways. He also reported that on the 16th of April, 1925, the Board of Trustees authorized the creation of a department of Industrial Engineering and elected John Younger, a Cleveland consulting engineer, to head that department. He made no mention of an obstacle that had been overcome: a complaint by the Dean of the College of Commerce and Administration that certain of the industrial engineering courses duplicated work given in that college.

Conditions were improving. The Engineering Experiment Station Building (designed by Prof. J. R. Shank of Civil Engineering to use the steel for a power plant which was not needed by the U. S. Government and was therefore available at a bargain price) would be completed in the fall of 1925, making space for Professor Eno's soils research, the State Highway Testing Laboratory then in Brown Hall, and the million-pound testing machine. The "Broaden Out Engineers" lectures had been successful. (Some cynics referred to them as "Flatten out.") The third year of Survey of Engineering had been most successful. The broadcasting Station had had a good year and received from 600 to 1100 pieces of mail a week.

There was great concern, however, because the point system "hurdle" was putting many engineering students on probation or out of college, and was hardly fair because "engineering students at graduation must really have about eighty points in excess of the same requirements of the other colleges of the University." He questioned the position that "education and preparation for life's service is dependent entirely upon academic records."

During the year 1925-26, President W. O. Thompson retired and two professors known to many engineering students--R. D. Bohannan of Mathematics and H. C. Lord of Astronomy--died. Chemical Engineering had been made a separate department, removing its courses from the department of Chemistry. Professor E. F. Coddington of Mechanics had become professor of geodetic engineering in the department of Civil Engineering, teaching the courses in precise surveying and adjustment of observations that replaced the astronomy course formerly required for a degree in civil engineering. What used to be the Shops Building was now the Industrial Engineering Building. The Engineers' Round-Up was held in the new Engineering Experiment Station Building the 25th of February 1926. The College Faculty had been increased by allowing not to exceed two instructors from any department to be appointed to it. In meeting the 2nd of March 1926 the College Faculty "learned with great satisfaction of the election of Prof. G. W. Rightmire as president of the University" and extended its congratulations and expression of loyalty.

An inquiry of the junior engineering students disclosed that 78.8 per cent of the class were entirely or partly self supporting. Because of the hardship of so much work with study the S.P.E.E. Committee was asked to consider a schedule in which the four-year course could be made to cover five years.

At the S.P.E.E. meeting, Ohio Section, at the University of Cincinnati, Professor Magruder had learned from Dean Schneider of the College of Engineering that that institution was spending $100,000 a year on industrial research.

Engineers' Day, the 21st of May 1926, the Engineers' Council conferred on Dean Hitchcock the "Degree of Human Engineer," a recognition that the Dean described in his autobiography as his greatest honor. Engineers' Day and the annual Round-up had become traditional activities. Engineers' Day , with Open House in the Departments, were biennial affairs. On Engineers' Day 1928, a Waco airplane landed on the campus Oval.

Legislative appropriation early in 1927 made funds available for a small staff in the Engineering Experiment Station, and John Merrill Weed was appointed assistant to the director (later assistant director) effective in July, 1927. Prof. G. A. Bole, who had been with the Bureau of Mines experiment station in Lord Hall, became research professor of ceramic engineering in the Station. Besides the facilities for engineering research on the campus, the Station developed a a large amount of ceramics research work in cooperation with industry at the Roseville Brick Plant, near Zanesville, where a contingent of honor men of the Ohio State Penitentiary were available to assist the research engineers in their work. Professor Bole directed the work at Roseville, and the staff there included R. E. Birch, who left in 1930 to go with the Harbison-Walker Refractories Company and became director of research of that company; J. Otis Everhart, now chairman of the department of Ceramic Engineering at Ohio State University; and the late Dr. Walter C. Rueckel, who became an official of the Koppers Company. The "Roseville Alumni" and research engineers at the Station building on the campus have made a great contribution to the science of ceramics. The history of the Station will report the large amount of work accomplished in that department.

Funds for a staff stepped up publication as well as research of the Station. In March 1928 the Station began issuing a mimeographed "Activities Bulletin" monthly to inform faculty members and other interested persons of work on projects and publications. Radio talks on engineering subjects were also prepared and broadcast over Station WEAO, predecessor of WOSU. In March 1939 the Station started the monthly printed Engineering Experiment Station News, about 3,000 copies each issue. This periodical has become the quarterly News in Engineering.

University concern about giving the freshmen and sophomores the right start brought about the establishment of Freshman Week in the fall of 1927, and proposals to shelter the underclassmen in a "Junior College." Discussions during 1927-28 were pointed toward the importance of the Engineering College environment for freshmen and sophomores who aspired to careers in technology. Dean Hitchcock's questionnaire in Survey of Engineering disclosed that 87 per cent

of the freshmen did not feel that the work of the first year was too heavy. Professor Magruder studied the records of 853 freshman students in the Arts College and 394 students in the first year in engineering and discovered that the median beginner in engineering was more than four months older than the median freshman in arts. He thought prospective engineers might put off entering college until they had taken the prerequisite courses in mathematics, or might get a little practical experience before starting in college. He cited figures of Professor Toops of Psychology as proof that they were not older because they were duller:

> If, as Professor Toops' figures show, the engineers show a higher intelligence rating than do the arts students, other things being equal, these students should be asking for admittance at an age younger than the arts students because the likelihood of their being accelerated in the public schools is increased.

Magruder's report of the Junior College Committee "That the training of engineering students during the first two years of their college life can be most satisfactorily carried out by keeping those students in the organization of the College of Engineering and immediately responsible to the Dean and Faculty of that College" constrained the faculty to pass a motion that the "Report on the Proposed Junior Division of the University" be not approved.

In meeting the third of February, 1928, the Engineering College Faculty decided:

> In order to better correlate the work of the students and to humanize their work and also to relieve the Dean of the College of Engineering of some of his duties, it is recommended that the position be established and filled of a 'Junior Dean of Engineering,' who shall be responsible to the Dean and be a member of the Faculty of the College of Engineering. He shall have direct charge of the first and second year students.
>
> That these curricula be divided into Junior and Senior Divisions, each of two years.
>
> That (a) the proposed plan of employing junior deans who are experienced both as educators and also as experts in one or more of the lines of work covered by their respective colleges, be considered and possibly adopted by several of the other colleges of our University, and (b) that the Junior Deans form a Junior division Administrative Council...to consider, discuss, and decide questions relating to their distinctive work in the University relative to first- and second-year students, and possibly to include the work now being so successfully done by the Freshman Week Committee.

At the March 1928 meeting the Faculty decided that no student should be admitted to the College of Engineering until he had passed placement tests in mathematics and English, and no student in the College of Engineering should be admitted to the Senior Division until all entrance requirements had been fulfilled.

Lawrence D. Jones, instructor in Engineering Drawing, began attending meetings of the Engineering College Faculty early in 1928. He was to become secretary of the College less than two years later, and continue in that position until, in 1952, he became acting dean. He also served as secretary of the University Faculty Council, and was one of the best known and most liked members of the teaching staff.

Junior deanships were established in the five largest colleges of the University: Arts and Sciences, Agriculture, Education, Engineering, and Commerce.

Discussion of the qualifications a junior dean should possess is reported to have contained the remark that "He should be a combination of Jesus Christ and Santa Claus." The Junior Dean selected for the College of Engineering was the Secretary, Prof. William D. Turnbull of the Department of Engineering drawing. The junior deans were ready for business when Freshman Week 1928 began.

Dean Hitchcock reported creation of the position of junior dean as "the most outstanding event of the year"1928-29. This official was to work on personal problems of the lower classmen, and:

> For filling this position we 'drafted' Professor William D. Turnbull of the Department of Engineering Drawing. The year's work has demonstrated to many of us that the selection was a very wise one, and I consider the College especially fortunate in having been able to secure from its staff one who is so well qualified....

Junior Dean Turnbull reported in detail on the first year of his work:

> Undoubtedly many of the indictments of mass education are true. Students <u>are</u> lost in the crowd. Personal contacts are not attained....One cannot, however, but feel sorry for the apparent pessimism and sadness of most of the critics. Eighteen years as a teacher of freshmen and sophomores and a year in the capacity of

> junior dean have given me a feeling of confidence in the earnestness and serious purpose of our engineering students and an optimism regarding the youth of today who in such large numbers are seeking a higher education in our colleges and universities....Our student body is a typical cross section of the youth of our state...The great majority are sons of people in moderate circumstances and are eager to work to pay part of their expenses in the college....
>
> One of the primary purposes in appointing the junior deans was to humanize our educational methods. During the Autumn Quarter all the freshmen of the College of Engineering were called to the office for a personal and friendly interview with the Junior Dean. Interviews in response to a call from the College Office were 434, plus 24 voluntary interviews.

During the year the number of voluntary interviews increased, and Mr. Turnbull regarded this "as significant of the confidence of the students and their desire to lay their problems before the Junior Dean." There were also interviews with all sophomores on probation, and voluntary discussions besides, as well as with parents. The Junior Dean was impressed with "his responsibility in advising and reassuring the parents....If this be coddling, let our critics make the most of it."

This point of view appears somewhat different, though not fundamentally so, from that expressed in the annual report for 1922-23 of the Dean of the College of Arts and Sciences:

> From time to time the College is criticised because of the numbers of students who fail. I think this criticism results from lack of knowledge of the facts. A University must be a democracy and the student must assume his share of responsibility. The standards of requirement are by no means too high and the only way of maintaining them is to enforce them...

Mr. Turnbull had written many letters and participated in situations calling for tact and sympathetic understanding. Also:

> Additional personal contacts or what might be called some of the extra-curricular activities of the Junior Dean enabled me to meet students in all classes and in all colleges. The Engineers' Council, a body of students initiating and supervising most of the activities of the College of Engineering, made the Junior Dean an honorary member. At the Engineers' Round-up the Junior Dean and Professor C. E.Sherman gave a humorous debate. The fireside sessions at various fraternities gave an opportunity for discussion of personal and life problems....I received many valuable suggestions from the students and became more convinced than ever of the need for a closer understanding between instructor and students, of the need of professors who, as the students put it, are "human."

> That the students are appreciative of getting acquainted with members of the faculty is shown by the replies of the class in Survey of Engineering to the question: "Do you favor more personal contacts between the faculty and students? "Yes" answered 295; only 30 voted "No." ...In answer to the question "Did Freshman Week help you?" 247 answered "yes," 54 answered "no."
>
> One of the most pleasant, and in my opinion, most valuable, activities of the Junior Dean was the weekly contact with all the freshmen at the Survey of Engineering lectures....In the questionnaire the students were asked "Have you gained anything from this course in Survey?" The response was almost unanimous, 323 answering "yes" and only 10 "no."
>
> The ideal that I have set before myself as Junior Dean is to know the instructors of freshmen at least as well as we are insisting that the instructor shall know his students.

The junior deans set up "demonstration interview sections" to supplement their interviews with meetings between certain instructors and students. Miss Harbarger and Mrs. Hitchcock in the department of English had conducted interviews during the Spring Quarter and the results were so favorable, not only for help in English but also in other ways, that all sections in freshman engineering English and certain sections in other courses were scheduled for personal interviews the following year.

Mr. and Mrs. Turnbull had chaperoned the Scarlet Mask Club on tour for performances in Indiana and Ohio, and he considered that activity "humanizing." With J. M. Weed of the Engineering Experiment Station, the Junior Dean had visited many Ohio industries and given radio talks on them, and had written articles for the Ohio State Monthly. He had worked with remedial reading sections, had served as secretary of the Junior Council, had continued as secretary of the College of Engineering, had prepared advice for the University examiner on sequence and content of high school courses for those preparing to enter the College of Engineering, and had served on a number of College Committees. It was a large amount of work, but:

> The duties...are pleasant, interesting, stimulating, and give one a sense of accomplishment...I expect always to be available for personal consultation by the students, and to avoid grounds for criticism that we have humanized education by what might be called 'mass production of personal contacts.'

Though a large amount of instruction in mathematics, physics, and chemistry was teaching students of the College of Engineering, pressure was building up to make the departments giving that work a part of the College of Arts, Philosophy, and Science for administration. A motion adopted the 7th of June 1928 read:

> It is the sense of the Engineering Faculty that it would be detrimental to the Engineering College to transfer the departments of Mathematics, Physics, and Chemistry to the College of Arts, and that a committee be appointed....to confer with the President in regard to the matter.

The committee consisting of Dean Hitchcock and Professors Demorest, Chubb, Watts, Sherman, Caldwell, Younger, Magruder, and Nold, duly conferred. Nevertheless, at faculty meeting the 8th of October 1929 the dean announced that the transfer had been made. Change of administration made little difference in loyalty, apparently, in the case of a number of professors, notably Alpheus and Alva Smith in Physics, Day and Foulk in Chemistry, Weaver and Kuhn in Mathematics, who continued to participate actively in Engineering Faculty meetings.

Having served as secretary of the College since the 10th of October 1922, but needing more time for his duties as Junior Dean, Mr. Turnbull resigned the secretaryship at the October 1929 meeting, and Assistant Professor Lawrence D. Jones of Drawing became secretary.

In June 1929, the S.P.E.E. had met at Ohio State, the largest meeting in the history of the Society. Dean Hitchcock became one of the S.P.E.E. vice-presidents, and Miss Harbarger was chairman of the section on English.

Architecture and Architectural Engineering were changed to five-year curricula in November 1929, effective for all new students registered for the autumn quarter 1930. Various elective courses were discussed and approved for a number of curricula, including Geography 603,"Localization of manufacturing industries of the United States," and Psychology 501, "Psychological Problems in Engineering." Engineers could elect Music courses, also.

At the meeting the 3rd of December 1929 it was announced that the offices of

the College of Engineering had been moved from the cramped quarters in Lord Hall to Room 120 in the south end of the new Chemistry Building. Faculty meeting moved to that building also, the 14th of January 1930. At that meeting Prof. A. J. Fairbanks, teaching aeronautical engineering courses, sat with the faculty for the first time, though he was not formally presented until the meeting of the 4th of February. At the February meeting, Professor Caldwell introduced Erwin E. Dreese, new professor and chairman of the department of Electrical Engineering.

Enrollment peaked in those two years as the Great Depression was starting; there were 1632 students in the fall of 1929 (including 508 freshmen) and 1733 enrolled in the fall of 1930 (519 of them freshmen). Dean Hitchcock reported that the most outstanding event of the year 1929-30 was the activities of the Junior Dean:

> It was indeed very gratifying to see the enthusiasm with which Professor Turnbull tackled those problems having a vital bearing upon the scholastic welfare and success of our undergraduates, particularly the freshmen...The creation of this position is proving most constructive for this college. No more can it be said that the small engineering schools are preferable on account of their greater personal contact with the instructor....
>
> The activities which are the most effective in bringing about unity and solidarity in the student body are the Ohio State Engineer's staff and the Engineers' Council. Very few outside of the college, and many within, do not realize the important parts played by these two groups of upperclassmen. The publishing of the Engineer is a student responsibility which goes far beyond the campus, for it ties our College in with 22 other leading engineering schools...Many students, especially upperclassmen, do not give this activity their support through a subscription... The freshman class always shows the highest percentage of support. One way to solve this problem is to place this item on the engineering student's fee card.
>
> The Engineers' Council, which is a fine cross section of the upper-class student body, had a most successful and active year. The annual Round-up, held in the large testing room of the Engineering Experiment Station, went over with its usual enthusiasm and success...Another important responsibility of the Council is the direction and supervision of the many activities of Engineers' Day. This year, on the preceding evening, 'open house' was held by the departments of Electrical, Industrial, and Mechanical Engineering. The attendance was beyond expectation. A careful

> observation and registration indicated that about 1,500 inspected each department. The parade of floats on Engineers' Day around the oval, led by two university bands, was a great success...The winners of the silver cups for the best exhibit and for the best float, were the department of Electrical Engineering and the freshman engineering class, which entered a float for the first time.

Regarding the transfer of Mathematics, Chemistry, and Physics to Arts, Philosophy, and Science, Dean Hitchcock stated:

> It was to be expected that the engineering faculty would not look with favor upon such a change, believing that the most important fundamentals of engineering should be taught in this College. However, since engineers are organization men, regardless of what the decisions of their superiors may be, their interest, enthusiasm, and loyalty will not be lessened, and they will always support wholeheartedly all constructive measures.

During the year Junior Dean Turnbull, in addition to all his other activities, had had 1,337 personal interviews with students--937 with freshmen, 326 with sophomores, 67 with juniors, and 7 with seniors. Cooperating faculty members had had 1,563 personal interviews with students.

Regarding the departure of R. E. Birch from the Engineering Experiment Station staff, Director Hitchcock observed: "We realize that training research men for the industry is an important function of an engineering experiment station." The Station had attained, in resources and work accomplished, fourth place among the 39 engineering experiment stations of the country. Monthly meetings for discussion of research projects were held; one meeting had been at Battelle Memorial Institute. Radio talks were given twice weekly. The circulars on home ownership, purchase and use of coal, and selection of dinnerware had made the Station generally known.

In June 1930 the College faculty recommended establishment of Engineering Extension as a division of the college of Engineering. The Dean announced that the Board of Trustees had authorized the College of Engineering to prepare plans by which the Lamme Medal for meritorious achievement in engineering might be awarded, in accordance with the bequest of the late Benjamin G. Lamme. The Engineers' Council and 10 student societies requested that Public Speaking for Engineers be made a required course in the engineering curricula. The faculty did

not agree in requiring public speaking for all curricula, but recommended drawing attention to it and encouraging students to organize departmental societies. Engineering interdepartmental debates were a successful feature of the thirties. At commencement in June 1931 the first Lamme awards were made to two alumni, Charles E.Skinner, 1890, and Arno Charles Fieldner, 1096. At Commencement in June 1932 two more Lamme awards were made, one to Ralph D. Mershon, 1890, one to A.V. Bleininger, 1901, and the honorary D. Sc. was conferred upon Charles Frederick Marvin, 1883, the mechanical engineer who had become ch director of the United States Weather Bureau.

Hard times had their effect. At the Engineering College Faculty meeting the second of December 1931, Prof. C. T. Morris reported on steps of the Columbus Engineers Club to aid unemployed engineers. At a meeting the 16th of December 1931, the faculty adopted a report on permitting qualified unemployed engineers to audit courses without paying fees. Enrollment for the winter quarter 1932 was down to 1463, and 12 auditors were reported.

Despite the success of the junior divisions in the five largest colleges and the success of the junior deanships, the question of a "junior division which will underlie all the colleges of the University and which will afford appropriate preparation for the advance of the student into any of the Colleges" reared its head in the spring of 1931. The June second, 1931, meeting of the College of Engineering adopted a committee report with eleven conclusions and recommendations refuting the proposal and concluding:

> We are in favor of training engineering students in dealing with social, economic and other human problems, but only after they have had a thorough training in the engineering method of approach.
>
> Because of the phenomenal success of the engineering method in the solution of the problems of production, we believe that engineering students should be given formal courses in such subjects as distribution, personnel work, and industrial stabilization.
>
> ....We believe also that these courses should be given within the College of Engineering and by men well versed in the scientific engineering method, and recommend that a related series of three-hour courses in human and social relations be prescribed throughout the third and fourth years.

Edward Orton Jr. died the 10th of February,1932, and the March Faculty meeting authorized a committee to prepare a memorial to the distinguished former faculty member, a report that covers twelve pages of the record book. At the meeting the 7th of June 1932, Professor Chubb recommended making the Department of Architecture into the School of Architecture, the first of a number of changes which finally brought about dropping the curriculum in Architectural Engineering, making the fourth and fifth years of the course either the design option or the construction option, and adding the curriculum in Landscape Architecture. Because so many graduates in architecture had won prizes for study abroad, Professor Chubb had said, "Study architecture at Ohio State and see the world."

Enrollment in the fall of 1932 was down to 1429, including 335 freshmen. The plan of permitting auditors was continued. In the spring of 1933 the five-year curriculum in Agricultural Engineering was approved. Summer jobs were hard to get, so the degree-granting departments were permitted to waive this requirement for graduation. The Engineers' Council requested permission to hold Engineers' Day in the spring of 1933, but the faculty decreed that the biennial schedule would be adhered to.

depression
The/nadir of autumn quarter enrollment was reached in 1933, when only 1201 students were enrolled, only 258 of them freshmen. President Rightmire's report for the year ending the 30 of June 1933 stated that the University power plant was at last complete, and that Registrar Edith D. Cockins had "christened" the last boiler "McCracken," breaking a bottle of Mirror Lake water over its"prow."

Several faculty members took leaves of absence during the depression emergency, and some were put on part time. Most activities, however, continued. Engineers' Day was held, as usual, the 11th of May 1934. A dramatic group, "The Quadrangle Jesters," presented a farce, "She Run Him Down, or a Snork in the Grass," in December 1933, complete with "Beef Trust Chorus." The players'point-hour ratio average was 2.2.

During the year 1933-34, Prof. G. W. McCuen, chairman of the department of Agricultural Engineering, was president of the American Society of Agricultural Engineers. Daniel J. Brumley, an 1895 graduate of the College of Engineering, received an honorary Doctor of Engineering degree at the June 1934 commencement. A June 1934 graduate in civil engineering was Roberto Alvaro Sanchez who later became Governor of Puerto Rico.

Enrollment the fall quarter of 1934 was 1349, including 448 freshmen. The College was paying attention to the Engineers Council for Professional Development, and Junior Dean Turnbull was giving the E.C.P.D. aptitude tests in mathematics and English. The attention of the dean had been called to the placement bureaus operated by Cornell, Penn State, and the University of Pennsylvania. Harold Hazen, an exchange professor from M.I.T. was on duty in Electrical Engineering, and John Byrne, a graduate in Engineering Phsyics on the Electrical Engineering faculty was spending the year at M.I.T.

Beginning the first of January 1935, Hurlbut S. Jacoby, a Cornell graduate in civil engineering and one of the founders of the H. K. Ferguson Company of Cleveland, became field director of the Engineering Experiment Station. His employment had been made possible by the generosity of James F. Lincoln, a graduate of the College and president of the Lincoln Electric Company. Mr. Jacoby's job was to obtain industrial research contracts. The Ohio State University Research Foundation, with Jacoby as its first director and President Rightmire as president, was formally established in the fall of 1936.

In February 1935 a five-year curriculum in chemical engineering was transmitted to the Council on Instruction. At the April 1935 faculty meeting the Dean announced a schedule of charges for use of Engineering Experiment Station equipment in private work, and a committee was appointed to devise similar plans for use of other University equipment. Deaths of faculty members during 1935-36 included Jesse E. Day of Chemistry, A. H. Vilbrandt of Chemical Engineering, and William T. Magruder of Mechanical Engineering.

Dean Hitchcock reported in June 1935 to the president that the past three years had been "rather trying and unsatisfactory," but "the forward movement in the direction of better teaching has continued with the same interest and enthusiasm as during more prosperous days. The morale of the staff has been excellent regardless of the most serious reduction in salaries." Professor Fairbanks and the work in aeronautical engineering had departed. However,

> During slack seasons, or in our case times of depression, when activities are in some directions necessarily at a minimum, we can take stock of ourselves and maybe do some things we have left undone or have wanted to do. For many years this college has not been satisfied with the way mathematics has been taught to our engineers... Prof. E. E. Dreese, chairman of the department of Electrical Engineering, a relatively 'new man on the job,' one with a background of industrial experience, soon sensed the situation...That department requested that an experiment be tried during 1934-35 with the second-year electrical engineering students in the subject of calculus, to be taught largely by engineering professors. To quote the action of the faculty:...'It is the purpose of the course to teach techniques and processes of the calculus in connection with physical phenomena and relationships which occur ordinarily in engineering practice.' Full power over the courses, instructors, etc., was placed in the hands of a committee consisting of Professors Dreese, Ott, Alpheus Smith, and Weaver...Classes were taught by Professors Bibber, Ott, and Weaver, assisted by Dr.Wylie...So satisfactory was the year's trial that the committee in a very complete report submitted at the close of the year made the following recommendations:
>
> 1) That physical analysis type of presentation of mathematics to engineering students should be continued in the sophomore year and extended into the freshman year.
> 2) That close coordination of instruction in physics, mechanics, and mathematics in the sophomore year should be continued and strengthened.....

The dean repeated his praise of the Engineers' Council and its activities, including the fostering of the "Quadrangle Jesters," the dramatic group that took its name from the proposed "Engineering Quadrangle," the open square that now contains the Physics Building. A feature of Engineers' Day 1934 was the bringing of 80 outstanding high school seniors to the campus and housing them at the different fraternities.

Reports of this period in the history of the College of Engineering do not mention the activities society, Texnikoi, but it was active,having been founded in 1924.

Though the curriculum in Applied Optics had originally been in the department of Physics, and Physics had been transferred to the Coleege of Arts, Philosophy, and Science, Applied Optics, apparently, had been left behind.* Candidates in that curriculum were recommended for degrees by the College of Engineering. Professor Howard D. Minchin of Applied Optics attended faculty meetings. The College faculty record book records that at the meeting the 12th of November 1935, Assistant Professors J. O. Everhart, A. H.Dierker, and G. A. Fry sat with the faculty for the first time. Everhart and Dierker were both on the Engineering Experiment Station staff; now Dr.Everhart is chairman of Ceramic Engineering and Mr. Dierker is a consulting metallurgical engineer. Dr. Glenn A. Fry is the distinguished scientist who long headed the School of Optometry.

H. A. Toulmin, a Dayton patent lawyer and graduate of Ohio State, established a gold medal, to be awarded, beginning in 1936, to the student in engineering who would present the best essay on the influence of manufacturing upon the economic and social condition of the community. A committee administered the award over a period of five years, 1936-1941. The first Toulmin medalist, in 1936, was George S. Bonn, a graduate student in chemical engineering, whose subsequent career has included a master's degree in library science, a year as Fulbright fellow to study technical literature in Japan, and teaching library science at Keio University, Rutgers, and the University of Hawaii. He is now (1969) teaching in New Delhi, India. No Toulmin medal was awarded in 1937. Interestingly enough, in the five-year period, before the medal was discontinued, all four winners were students of chemical engineering.

In March 1935 the Engineering faculty requested the University administration to cooperate with the Dean of the College of Engineering in arranging the visit of the accrediting committee of the Engineers' Council for Professional Development. The visit took place the 17th and 18th of March 1937 in the spring of 1937, and the announcement of accreditation was made during the academic year 1937-1938.

*Enrollment figures given for the College of Engineering do not include students in Applied Optics. Effective the first of July, 1937, Applied Optics was transferred from the College of Engineering to the department of Physics in the College of Arts and Sciences under the name "School of Optometry."

June, 1936, was the month of Dean Hitchcock's seventieth birthday, and his successor had not been selected. President Rightmire called Junior Dean Turnbull to his office and asked him to accept appointment as acting dean. Mr. Turnbull was intimately acquainted with the College, having served as secretary for seven years and junior dean for eight years, besides having presided at faculty meetings for two months in the early thirties in the absence of Dean Hitchcock, and he accepted. As acting junior dean he recommended John Merrill Weed, assistant director of the Engineering Experiment Station, who had assisted him in conducting many interviews.

At the faculty meeting the 6th of October, 1936, Acting Dean Turnbull announced that Mr. Hitchcock had become dean emeritus the first of September; also that James E. Boyd had become emeritus professor of Mechanics.

It was announced that the E.C.P.D. forms for statistical information had been distributed and should be completed as quickly as possible by the departments and the College office in anticipation of a visit by the accrediting committee.

Enrollment that fall quarter was near a peak for the College, 1719. (The 1733 of the Autumn Quarter 1930 was slightly higher.) The number of freshmen was the highest, 594, and there were 528 sophomores. Moreover, 377 of the freshmen were undecided about the branch they preferred, and that was a record. Fortunately, the acting junior dean had the assistance of the acting dean and many faculty members in conducting interviews and making decisions, and the year went smoothly. The freshmen responded well to the Survey of Engineering lectures, giving a standing ovation to Professor Dreese of Electrical Engineering, whose talk included the statement, "When the energy of the atom is unlocked, mankind had better behave like gentlemen." During the year the freshmen apparently made up their minds, perhaps aided by the lectures on the various branches. Freshman enrollment the winter quarter 1936-37 was 581 and the number undecided was down to 183. In the spring quarter 1937 freshman enrollment had shrunk to 528, with 120 undecided.

That 1936 freshman class, because of its size and place in time (the depression was somewhat less severe and war preparations had not become active) was the subject of study by a committee appointed in April 1944 on the advisability of terminal curricula. The findings of that committee had much to do with establishment of the five-year curricula in 1945.

Charles E. MacQuigg, E.M. 1909 from Ohio State, was chosen as Dean during the academic year, , his tenure to begin the first of July 1937. Thus the College was in the hands of Acting Dean Turnbull only nine months. The annual report for 1936-37 was prepared by Dean MacQuigg, who wrote:

> Student enrollment is again increasing with stimulating effect... This is due to several causes, among them the recognition that the engineering approach should be tried on many of our present social problems, and, in addition, that engineers are going to be required in increasing numbers to function in the highly mechanized state of society...
>
> Under the wise administration of the Acting Dean, faculty coherence has been maintained; the best type of cooperation among departments and between faculty and student body has been evident...Under the acting junior dean,the work of that office has continued along established lines, with emphasis on assistance in the adjustment of personal problems...The lecture course, Survey of Engineering, was supplemented by some general interest subjects in the way of talks given by specialists on the faculty. There was good student response.

Highlights of 1936-37 in the College report included:

- Cooperation with the College of Agriculture, and establishment of the curriculum leading to degrees in Agriculture and Agricultural Engineering. There was also research cooperation on application of engineering to agriculture, such as study of water flow in ditches and study of wall pressure in grain storage bins.
- Personal survey by the E.C.P.D. Investigating Committee, the report not yet made public.
- Organization of the Ohio State University Research Foundation.
- R.O.T.C. changed to include Engineer Corps, U.S. Army, a "splendid tribute by the War Department to the standing of the school...." and "a heavy responsibility upon the School for adequate instructional work in this field."
- Placing the subscription to The Ohio State Engineer on the students' fee cards, thus assuring general circulation.
- Architectural Engineering discontinued, the single course leading to bachelor of Architecture effective 1938.
- Shift of emphasis by the Engineering Experiment Station from research of a general character toward utilitarian projects with possibilities of industrial cooperation.

Also, during 1936-37, the College faculty took note of criticism by President Roosevelt of the profession's alleged failure to appreciate the social significance of its work; made the bulletin changes to announce the curriculum in Landscape Architecture; heard of the three-weeks school for operators and maintenance men of diesel engines and of the 725 registration at the sixth annual welding conference; distributed a blank prepared by the Student Senate for rating faculty members; listened to Professor Dreese's explanation of the $200,000 contest of the James F. Lincoln Arc Welding Foundation; and tentatively approved a policy statement on outside employment by faculty members.

This policy statement on outside employment, submitted the 9th of March 1937, to the President and Board of Trustees by a committee consisting of Professors F. W. Marquis, William J. McCaughey, and Clyde T. Morris, was designed to ward off criticism for unfair competition with practicing engineers, while at the same time making available the services of faculty members possessing special skills. It contained these provisions:

> Members of the staff may render professional services for compensation but in no case may such outside employment interfere with regular University duties.
>
> Within these limits teachers of professional subjects, such as engineering, are encouraged to engage in the practice of their profession so far as may be desirable to maintain and increase professional competency.....
>
> Routine tasks of a commonplace type are not encouraged....
>
> The University laboratories and equipment are primarily for instruction and research.....
>
> The name of the University shall not be used in any way in any reports.....

The President's report for the year ending June 1938 told of the new Dean of Engineering:

> Charles E. MacQuigg came out of industry to the deanship of the College of Engineering at the opening of the year. He is a graduate of this University, has had active engineering experience in various sections of the United States, was for a number of years in charge

> of the Department of Metallurgy at Pennsylvania State College, and in recent years has been associated with the Carbon and Carbide Company of New York City, generally in charge of research projects carried forward in various engineering colleges of the United States and in research foundations. He has entered enthusiastically upon the work and during the year has been making a careful study of the College and has found the most pleasant relations with the faculty. He is bringing to the deanship the qualities which made him so successful in dealing with the human and material situations in the commercial world.

When the Autumn Quarter opened in 1937, Dean MacQuigg had reason to note the "stimulating effect" of an increase in enrollment. There were 1935 in the College of Engineering, including 589 freshmen (almost as many as the year before), 636 sophomores, 388 juniors, and 307 seniors, plus 15 architectural students in the fifth year. Assistant Professor E. M. Boone was presented to the faculty. There was a little more tinkering with the statement of the University on the professional degrees.

Dean MacQuigg's report for the year gave special mention to an $18,000 appropriation "of inestimable value" in enabling the College to buy equipment:

> Engineering science is a continually unfolding development, and our students, to be adequately prepared, must be instructed by equipment as modern as it is possible to obtain; otherwise they will find upon graduation that the apparatus used by them in college has been obsoleted by industry....
>
> It now seems certain that the interest of the people of Ohio in engineering will continue to increase. This is due to several causes, among them the recognition that more of an engineering approach should be tried on many of our present social problems, and,in addition, that engineers are going to be required in increasing numbers to function in the highly mechanized state of society.....While it is recognized that certain curricular requirements must be rigidly adhered to, nevertheless it is a function of the University to build for citizenship as well as for professional success,.....to assist the student to adhere strictly to the rigorous discipline of his professional education and at the same time maintain a proper balance with his social environment....
>
> ...Engineers' Day was celebrated with a parade of floats representing the various departments of the college and some of the engineering groups. Open house was held in the laboratories with demonstrations of new developments in engineering and research....Quadrangle Jesters presented a farce to a capacity house in the University Chapel...An Engineers' Dance in the Armory terminated the celebrations. Alumni of the College were invited back for this occasion and quite a few responded. Plans for closer contact between the college and thegraduate engineers and former students are being developed....

Dean MacQuigg was speaker at the Summer Quarter Commencement Convocation, 1938

Hurlbut S. Jacoby, first director of the Ohio State University Research Foundation, died the 16th of November 1938, and Dean MacQuigg assumed charge of the Foundation until Dr. A. Ray Olpin came early in 1939.

At the faculty meeting the first of November 1938 Professor Younger introduced Assistant Professor J. R. Stitt, in charge of the Industrial Engineering Department's new curriculum in welding engineering. The December meeting heard memorial tributes to Mr. Jacoby and to Prof. Frank H. Haskett who headed the department of photography after it was established in 1929 and who died the 8th of November.

Not all the agitation for a five-year program in engineering came from within the College; the meeting of March 7, 1939 considered a letter from the Council on Instruction requesting that the College of Engineering inquire into the possibilities of five-year curricula. In meeting the 2nd of May 1939 the Dean was asked to appoint a committee "to make a complete study of the educational, administrative, intercollegiate, collegiate, and financial implications of changing the normal engineering educational program from four to five years," the committee to report to the faculty by March 1940. The committee consisted of Prof. H. E. Nold, chairman, and professors John L. Carruthers, D. J. Demorest, E. E. Dreese, Paul Lehoczky, C. A. Norman, and John C. Prior.

Other faculty actions of this time included approving the plan of making the inspection trips to visit industries fall between quarters rather than biting into the time of academic work, and "supporting the recommendation of the University Librarian

> That it would greatly serve the interests of the University as a whole as well as of this College if there were established a general library of Engineering, but that such general Engineering Library should in no way curtail the effective operation of the present departmental libraries.

Because it afforded space, the Engineering Experiment Station building was the site of the cyclotron, built over a two-and-a-half year period, 1938-41, at a cost of about $40,00, plus certain components donated by Mr. Julius Stone. Prof. J. R. Shank had become assistant director of the Station. After his service as acting junior dean, John Merrill Weed held the position of editor until he went on military leave in 1942. By "moonlighting"he continued the next 22 years to write the Research Foundation monthly magazine Science and Appliance.

During 1939-1940 the University approved a civilian pilot training course in cooperation with the Civil Aeronautics Authority. A committee of the College reported that rather than a central placement bureau, there should be a sort of clearing house administered under the direction of a placement committee responsible to the dean, with contacts with industry to be established by the individual departments as they might desire. Professor Dreese led discussions on the proposed five-year curricula.

Edwin F. Coddington retired that year from teaching geodesy in the department of Civil Engineering. Professor Christopher E. Sherman, beloved as "Chris" by hundreds of former students in civil engineering, died the 6th of May, 1940, and the memorial tributed adopted by the Faculty read:

> In the remembrance of his students, Professor Sherman's generous influence and genial personality live on. His productive contributions to engineering science and public service, his historical and literary proficiency, the friendly warmth of his companionship, the charm of his wit and the sureness of his wisdom--all these his faculty colleagues and the members of this University recall and hold precious...

As 1940 drew to a close, the sounds of preparation for war grew louder. At the Faculty meeting of the College the 5th of November 1940, it was announced that funds had been appropriated for Engineering Defense Training on the college level, and Professor H E. Nold would organize the courses offered by the University. There would be intensive training for the needs of industry engaged in defense production.. In December 1940 Professor Nold announced that 19 out of 28 courses of the E.D.T. program had been given tentative approval. The primary purpose of all courses would be to train for defense industrial needs.

E.D.T. courses started on the campus the week of January 6, 1941, with about 260 students, most of them employed. In February an E.D.T. course in Explosives was announced under the direction of Prof. Herrick Johnston of Chemistry. Courses were also to be given in the E.D.T. program in Mansfield, Middletown, and Springfield.

"The University helps to meet the National Emergency" introduced the section in the Ohio State report for 1940-41 on Engineering Defense Training. Dean MacQuigg had been appointed adviser of Region 12 in the E.D.T. program. The first half of 1940 Prof. H.E.Nold had directed courses in the E.D.T. night school program on the campus, at Armco in Middletown, and in the high schools of Springfield, Mansfield, and Martins Ferry. The Civilian Pilot Training program, first contracted for the 4th of October, 1939, trained 42 students the first year, and during 1941 145 had completed the primary course, and 19 19 the secondary course during 1940-41. The Research Foundation had assumed the responsibility of negotiating and administering all government defense research contracts, calling for use of personnel and equipment of the University.

S.P.E.E. meeting in Pittsburgh early in March 1941 discussed operation of engineering schools full schedule during the summer so seniors could graduate early.

Policies regarding requests for deferment of students from the draft were discussed at the College faculty meeting the first of April 1941. The College deferment committee, Professors Morris, Demorest, and Ott, suggested no request to defer students whose period of training would extend beyond June 1943 or whose point-hour average was below the 1.8 minimum. Requests should be "predicated upon the student's progress in his studies."

Professor Nold announced approval of five full-time Engineering Defense Training programs for the summer quarter: engineering fundamentals for non-engineering college graduates (one for those who had studied college physics and calculus, one for those who had studied algebra and trig), fundamentals for recent high school graduates, a course in explosives, and a course in the principles of radio.

The Faculty approved Prof. K. W. Stinson's plan for 3 hours credit for the private course, 5 hours credit for the restricted commercial course, in the Civilian Pilot Training Ground School.

Departments of the College united for the 1941 State Fair exhibit to show "What the Engineer is doing in preparing for Civilian Protection." In College Faculty meeting the 4th of November 1941 a 2-hour course, "An Introduction to Town and Regional Planning" was authorized for the Engineering College 1942-43 bulletin, elective for all students of the University of third and fourth year standing, "to awaken in the University student a consciousness of the vital part he may play as a citizen in the planning of his community."

Engineering, Science, and Management Defense Training courses (ESMDT) were reported at the faculty meeting the 2nd of December 1941 as enrolling some 1200 students, in seven Ohio cities in addition to courses on the campus. When the United States entered the war, the training courses became ESMWT, "war" replacing "defense."

Recommendations of a S.P.E.E. committee reported at the 6 January 1942 faculty meeting included: That institutions offering degrees in engineering be advised to graduate present (1942) seniors as early as possible...That plans be developed to seek federal support so colleges and universities may expedite graduation of other engineering classes without financial loss to the institutions or undue hardship to students. The faculty agreed that the dean might make emergency decisions in consultation with department chairmen, subsequently reporting to the faculty.

"Accelerated Program in Engineering" was the title of a statement approved at the meeting the 3rd of February 1942: "The Engineering College will operate on a four-quarter basis beginning with the summer quarter of 1942...During this summer quarter, courses normally offered in the autumn quarter will be given, and students will follow the autumn programs...In the autumn quarter of 1942, courses normally offered in the winter quarter will be given. Normal spring quarter courses will be given in the winter of 1943...The academic year will be completed by March 1943, and another year will be started in the spring quarter. Freshmen are urged to enter the College in June, and if they continue under the accelerated program they may graduate in three years."

Reports of the University for the year ending in June 1942 were headed "On the Classroom Front." By the accelerated program, students could give up summer vacation and go to school 12 months in the year.

Land had been obtained for an airport, and a course in aeronautical engineering was receiving attention. A "major contribution" of the Engineering departments was to direct "their alumni from non-essential to essential fields." Evening classes for ESMWT had enrolled 2345 to finish the courses, of whom 1995 or 85 per cent had received certificates of satisfactory work. Coordinator K. W.Stinson had directed the total of 400 in the pilot training school. "On the Research Front,"the Foundation had entered into 65 contracts during 1941-42. The College of Engineering had 'sharpened up' its courses to meet the demands of war; for example, the department of Architecture and Landscape Architecture had a course in camouflage.

President Bevis inquired about preparation of students for work if they should leave the College of Engineering at any period short of graduation, and a committee was appointed to inquire into the subject. The department of Physical Education sought to make all students take more physical training, but the College opposed that threat to take more of the students' time. In June 1942 the College committee reported that two or three quarters in engineering might prepare students for work as tracers and junior draftsmen; six quarters for sub-professional technicians; nine quarters for certain kinds of scientific aide services. Similarly, less-than-graduation studies might equip students for special duties in the armed forces.

Action of the Board of Trustees in the spring of 1942 noted the death, the 23rd of April, of Prof. Sada A. Harbarger, who had "been particularly helpful to faculty and students in the College of Engineering, and had built up a program of English for engineering and applied science students second to none in the country."

By July 1942 Professor Nold reported that the ESMWT courses had enrolled some 4500 students. At that meeting, the 7th of July, the faculty decided that students entering in the summer 1942 would be considered "the regular class."

"Twilight School" evening classes, carrying full college credit, were "launched" in the autumn of 1942. That fall, as reported in the College of Engineering records of the meeting of the 6th of October, total enrollment was 2094, including 38 in the Evening School. There were 247 second-quarter freshmen (presumably the "regular" ones who had entered in the summer quarter) and 677 first-quarter freshmen, making a total of 924. Sophomores numbered 519, juniors 340, and seniors 263.

Many of those students did not stay. At the meeting the 3rd of November, 1942, withdrawals were reported as "unusually heavy." Dean MacQuigg stated:

> Students would be well advised if they were told to consider carefully before deciding to leave school with the thought that the continuation of engineering education might provide a better means of service to the country than immediate enlistment...

Apparently too many freshmen were "irregular," for the faculty agreed at the November 1942 meeting that the next class should come in June, not in March. (Many of them would not be out of high school in March, of course.)

Lenora Glasgow, friend and advocate of engineering students for 30 years in the College office, retired at the end of 1942, and at the February 1943 faculty meeting Dean MacQuigg presented her with a wrist watch in token of the faculty esteem. Thomas Ewing French, retiring in 1942, was recommended for the Lamme Medal. Garden plots were made available for faculty members.

The new department of Aeronautical Engineering was approved by the Trustees the 8th of March, 1943. In April Dean MacQuigg announced that the University had been selected for STAR (Specialized Training Assignment and Reclassification) unit of the Army Specialized Training program (soon to enter the minutes as ASTP) and 600 men would be on the campus at one time for testing and reclassification. The question of credit for such courses (some of which were undoubtedly "pre-freshman") came up in future readjustments of programs. The college stood firm in its position on entrance requirements.

By spring 1943 half of the impressive enrollment of the autumn quarter had

melted away. The total was down to 1006, plus 17 in the Evening School. There were 32 first quarter freshmen, 24 second quarter, and 252 third quarter, a total of 308--exactly one-third of the autumn quarter total. Enrollment for the summer quarter 1943 was 608, plus 6 in the evening school, including 164 first-quarter freshmen, 21 second quarter freshmen, and 19 third-quarter freshmen. For the duration of the accelerated program, only two hours of Survey of Engineering would be required of freshmen.

During 1942-43 the addition to the Engineering Experiment Station known as the War Research Laboratory was completed. The Engineering Experiment Station staff was depleted by departures for military service, and "war and industrial research needed for war"took up nearly all the time of the remaining members.

Autumn Quarter enrollment 1943 was 688, plus 15 in the Twilight School. There were 183 first quarter freshmen, 113 in the second quarter, and 8 in the third quarter.

Something of a bombshell must have been dropped in the meeting the 15th of October 1943. A special committee was asked to report on whether to retain civilian courses or go entirely to A.S.T.P. courses. The committee "to study the matter of synchronizing and coordinating the civilian and ASTP teaching in the College of Engineering"recommended at the meeting of 2 November 1943:

1) That the College of Engineering continue a civilian program with the ASTP program
2) That the Engineering College civilian calendar be made the same as the ASTP calendar for all engineering departments.

Acceleration might be necessary in war, but in meeting the 4th of January 1944, the faculty found the majority opinion was against acceleration as an educational policy. In February 1944 a discussion of "The Technical Institute" was planned. This subject tied in with "terminal curricula," also under study.

A proposal to accelerate the progress of seniors by a cram course in the 1944 summer quarter, so some might graduate before being drafted was turned down.

Summer Quarter enrollment 1944 totaled 297, plus one transient and 35 in the Evening School, making a total of 333. There were only 93 first quarter freshmen, 20 in the second quarter, 21 in the third quarter, a total of 134. Despite the low enrollment and uncertainty, the faculty deliberations included ways and means to take care of the numbers when hostilities should cease.

Terminal curricula were considered at a special meeting in August 1944. There was a report of a case study of the freshmen who entered in the fall of 1936. Of the 550 reported on (The October 1936 report showed 594) only 34.5 per cent graduated in some department in the College of Engineering; 16.9 per cent had been dropped for low grades; 22.2 per cent had transferred to other colleges; and 26.4 per cent had left for other reasons. More than half of those who left had less than a 1.8 point-hour ratio when they left school, and 68.7 per cent had point-hour ratios under 2.00. About 69.9 per cent of the non-graduating students or 45.5 per cent of the entering class dropped out in 6 quarters of less. Those who could be helped needed help by the beginning of the fourth quarter.

Almost half of the graduates failed to obtain their degrees in the regular 12 or 13 quarters.

Approximately half of the graduates had point-hour ratios less than 2.5. The average point-hour ratio for the entire class was 2.60.

In summary, the committee reported:

1) Under the present system, 65.5 per cent of students entering the College of Engineering fail to earn degrees.
2) The majority who drop out of the College of Engineering are unable to maintain a high enough point-hour ratio.
3) Approximately 27 per cent of the class drops out by the end of the first year; 45.5 per cent are gone by the end of the second year; and 25 per cent remain longer than two years but fail to obtain degrees.
4) Approximately only 85 per cent of the graduates or 24 per cent of the entire class appear to have a chance of success as professional engineers.
5) ....It would appear that a point-hour ratio in mathematics less than 2.25 indicates lack of ability to succeed in professional engineering.

Proposals growing out of this report included giving "students who show poor promise of succeeding as professional engineers " an opportunity to train in a four-year curriculum, such as bachelor of industrial technology, and making such changes that "it would be possible to prevent students who have a poor chance of succeeding as professional engineers from trying for the engineering degree."

College of Engineering enrollment in the Autumn Quarter 1944 totaled 521 plus 111 in the evening school, a grand total of 632. More than half of them were freshmen: 245 first quarter, 69 second quarter, and 143 third quarter, a total of 328.

Consideration in the fall of 1944 of the accelerated program led to the conclusion that it had contributed to the war effort, but things had changed; physically fit sutdents were no longer being deferred. The need for omitting summer vacation periods no longer existed. It was therefore recommended that the present accelerated program be discontinued in June 1945, at the same time making proficion so students who enter in January 1945 could complete their first year 's work in the summer session.

Various discussions of establishing terminal curricula in a School of Technology, led to the passing of a motion "to give no further consideration to the establishment of short curricula."

In meeting the 15 of November, the faculty approved a recommendation "that the College set up an employment procedure...."

Preparation of the program for five-year curricula went on. President Bevis addressed the faculty in the meeting of December 5, 1944, stating "it was difficult to see how engineers could be trained in four years when one considered the longer periods required in other professions. " He was "glad to hear of the faculty approval of the five-year curriculum with the broadening courses included." He felt that "the expected heavy post-war loads made this a good time to try the experiment."

Professor Dreese suggested including a "Dean's course" in the fifth year of the proposed program. Various broadening courses were considered. In a number of meetings, the plan of studies was worked out. Provision had to be made, also, for students who had entered before out departing for war service or work in war industries.

Questionnaires sent to Ohio State men in service showed that a large number planned to return to college after the fighting was over. By 1536 to 330 they had indicated that they would not prefer to enroll in classes organized especially for veterans, but wanted to be in class with regular students.

There was discussion of provision for refresher courses for those who might have got rusty in some subjects.

Spring Quarter enrollment 1945 was down to 378, plus two auditors and enough evening students to make a total of 464. Summer quarter enrollment 1945 consisted of 242 day students, 3 transients, and 30 in the Twilight, a total of 278.

Dean MacQuigg's report for 1944-45 to President Bevis fitted the statement, "The University Looks Ahead." The Dean summarized the problems and the plans:

> The Engineering College was engaged on problems of (a) giving adequate service to the teaching needs of the military, (b) maintaining schedules for the upperclassmen enrolled in the several curriclua, (c) providing staff and facilities for the heavy program of war research (d) planning in detail the new five-year curricula which will be mandatory for all degrees in this college for classes entering upon engineering programs in the autumn of 1945...
>
> Enrollments of the usual regular candidates have been reduced by military service. The men under 18 years of age sent here in the Army Specialized Training Programs have given rise to problems of staff--not so much because of numbers but because of the lack of sufficient prior information on the numbers to be trained and the difficulty of obtaining instructors. This last is complicated by the fact that many staff members have been on leave of absence for war service....
>
> The major decision respecting the pattern of engineering education has faced the colleges of this country for two or three decades at least and involves decision respecting the content of the conventional disciplines of the various curricula such as civil, mechanical, electrical,and others. The point of contention has been chiefly the method of accommodating more of the studies which are variously termed 'social,' 'humanistic,' 'cultural,' or 'broadening' without at the same time squeezing out some of the necessary instruction in the technical subjects. To repeat, the debate has been more one of practicability than desirability. But let it be emphasized that the engineering educators have not conceded that the mastery of applications of science is not cultural in itself; the desire has

been to include more of the social stem of subjects to help in acquainting the young engineer with the increasing social implications of his work in this machine society.

After long consideration, the college faculty realized the impossibility of compressing the technical and the social studies within the framework of four years of undergraduate study and decided to go to the five-year curriculum which will essentially comprise the following basic structure: 84 hours of fundamentals such as mathematics, drawing, chemistry, physics; 51 hours of broadening such as economics, political science, sociology, psychology, history, etc.; 19 hours of general such as military science, physical education, etc.; 120-126 hours of departmental specialization, total 274 to 280 hours. A student showing special academic aptitude will be permitted to elect a pattern of study which, if sustained with the specified performance, will be rewarded at the end of five years with the master's in addition to the bachelor's degree. Those students maintaining less than special competence but still attaining the present required university point-hour average will receive the usual bachelor's degree with designation. Other leading colleges of engineering have adopted, or are considering, a similar plan.

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THE FIRST CENTURY OF THE COLLEGE OF ENGINEERING AT THE OHIO STATE UNIVERSITY

IV. THE FOURTH QUARTER

At the first regular Engineering College faculty meeting following the end of hostilities of the second world war, Dean C. E. MacQuigg welcomed back to the campus members of the teaching staff who had been absent on leave. The dean mentioned the problems facing the faculty. First was the problem of putting the new five-year curricula into operating form. In planning the five-year programs, the faculty had made it possible for students who had entered before the autumn of 1945 and accumulated at least one quarter's worth of acceptable work to follow the four year curricula, provided they returned within a reasonable time after leaving the service or war-related work. The problem of requirements for transfer students was referred to the Executive Committee. The final decision was that transfers who had accumulated at least a quarter's credit in engineering subjects should have the same privileges as regards taking the four-year courses as former Ohio State students.

Enrollment in the College of Engineering that fall of 1945 was close to a thousand--936 "regular" students and 136 in the evening school. The regular enrollment included 600 freshmen, 200 sophomores, 94 juniors, and 37 seniors, and five reported as in the fifth year. Of the freshmen, 142 were undecided on their choice of branch of engineering. The Junior Division was a very top-heavy tail wagging a light dog.

Relations with liberal arts colleges was a perennial problem. The dean was instructed to do what he thought best about arranging cooperative relations with arts colleges that had satisfactory standards. Industrial groups had called for special classes; a committee was to be appointed to study the need and possiblities for extension education in industry.

At that very first meeting, Dr. J. R. Withrow of Chemical Engineering brought up an old thorny problem. He questioned the policy of making students who came with deficiencies enroll in the College of Arts and Sciences to make up their entrance conditions: "These students come to the University to take Engineering, and they should be registered in this college where their advisers and counselors would come from the Engineering faculty." The faculty agreed that students with one entrance unit deficiency in plane geometry, as well as with other authorized deficiencies, ought to be allowed to enter the College of Engineering as pre-engineering students.

Implementing the combined program, to allow taking work for the master's degree along with the five-year course for a bachelor's degree, was discussed. The faculty thought that the master's work should include at least 15 credit hours in 800 courses, including thesis, and that to receive graduate credit, candidates for the master's who were in courses with candidates for the bachelor's should make at least an A or a B.

There was talk about the need for publicity for the new five-year curricula. At the March 1946 meeting the dean outlined a program of publicizing the innovation in local and national periodicals. The faculty thought that, with thec consent of his adviser, a student should have the privilege of taking a broad range of electives, from astronomy to zoology. It was agreed that the dean's course on ethics and other items of professionalism in the three quarters of the fifth year should be called Senior Assembly.

Instead of the usual attrition during the academic year, enrollment in the college increased, as programs for education, including the "G.I. bill" for veterans,were developed.

Flight training courses were described at the faculty meeting in March 1946. The faculty held back on giving academic credit for such work:

> It be the sense of the faculty that we have no objection to students in the College of Engineering taking flight training ...but it is hereby resolved that no credit be granted toward degrees in the College of Engineering for these courses except in substitution for the required courses in Military Science and Physical Education.

Second thoughts prevailed, and a month later the faculty reversed itself, declaring "That it be the opinion of the Engineering College Faculty

> (1) that the flight courses are desirable as a part of the training of engineering students;
>
> (2) that the acceptance of these courses for credit toward graduation be left to the various departments;
>
> (3) that engineering students be allowed to take the flying courses after the freshman year upon the approval of the department chairman.

Reconsidering again, at the May meeting the faculty decided that approval of schedules for flight training should be returned to the College office, and that the College of Engineering would accept credit in flight training courses toward its degrees to a maximum of three hours, these hours to be a part of the non-technical electives.

Approval came in April 1946 for the five year curriculum in Agricultural Engineering, described as

> Intended for students who desire to prepare themselves for ... professional work, research, college teaching, government work, extension activities in agricultural engineering, and the more technical phases of agricultural engineering processes and application in industry.

The arrangement was that students should complete nine quarters in the College of Agriculture, and then register in the College of Engineering.

Part of the return to normality that first year after the war was the resurgence of the student organizations. The Engineers" Council was reorganized, and Texnikoi was reported as starting up again.

Though students who were eligible to complete the four-year curricula in engineering were permitted to do so, the faculty was firm in the opinion that if they knew what was good for them they should switch to the five-year programs. Belief in the virtues of the five-year curricula was affirmed in a faculty resolution passed at the meeting of April 1946:

> Whereas, the Engineering College after thorough investigation and long deliberation has evolved five-year undergraduate curricula, and
>
> Whereas, we believe these curricula are a great step forward in engineering education, and
>
> Whereas industry is in general in accord with the aims and purposes of our educational policy and is desirous of obtaining not only well trained engineers but also citizens with a broad background, and
>
> Whereas, the immediate availability of said five-year curricula to our students will be a distinct benefit to them, therefore
>
> Be it resolved:
> (1) That any student who is eligible for the four-year curricula but is desirous of enrolling in the five-year be encouraged to do so, and that the separate graduating departments arrange for suitable substitutions where necessary, and
>
> (2) that a notice to this effect be published.....

John Younger, the first professor of Industrial Engineering, died the 14th of November 1945, and the faculty, in meeting, paid tribute to his wealth of experience, his eminent position in industry, and his deep sympathetic interest in young men as evidenced by his extra-curricular activities on the campus, including founding the Quadrangle Jesters. Similar memorial tribute was paid to Professor Horace Judd of Mechanical Engineering, a quiet and scholarly man who passed away the first of December 1945. Such recognition of the passing of members of the Engineering College faculty has been a gracious part of the deliberations of the faculty throughout the history of the College.

Enrollment during the Summer Quarter 1946 was 1628, plus 29 in the Twilight School, 4 auditors, 3 special students, and one transfer student. With the vererans coming in in large numbers, some faculty members would practically be required to teach four quarters right around the year, a complete negation of the principle that the academic year should provide time for recharging the mental batteries by further study or industrial contacts, a principle the Board of Trustees had accepted in setting compensation for fourth-quarter teaching at only two-ninths of the pay for the usual three-quarter academic year. At the November 1946 meeting the faculty resolved that the University reestablish three-quarter teaching schedules as soon as possible, but make the regular quarter stipend apply to the fourth-quarter during the emergency. The Board of Trustees took appropriate action on this matter, making the emergency period extend through June 1949.

What to do about credit for advanced study in military and naval science kept coming up. At a special meeting in August 1946 the faculty decided that the full 18 hours of advanced R.O.T.C. and N.R. O.T.C. should be accepted toward the requirements for a degree as electives. It was also decided that summer military camp or the summer cruise for Navy cadets should be accepted as one of the requirements for summer experience in industry. Subsequently, in meeting the first of May 1947, the faculty passed a motion that departments requiring summer experience courses could accept adequate reports on military or national service during the war in lieu of reports on industrial employment.

There was no time off for the dean or junior dean or for the college office during that summer of 1946. Of the 1628 regular students, 821 were freshmen, 173 of them undecided about branch of engineering, and there were 530 sophomores. The largest enrollment was in Mechanical Engineering, 349, including 147 freshmen. Electrical was next with 330, including 166 freshmen, and Chemical had 217.

Autumn Quarter 1946 really brought the post-war flood of students. The total enrollment that fall was 4,396, including 4,257 regularly enrolled, 128 in the Twilight School, and 11 special. Of the 2,264 freshmen, 858 were undecided on their choice of branch of engineering. There were 1,098 sophomores, 564 juniors, and 322 seniors, plus 9 in the fifth year. (The courses in Architecture were already on a five-year basis.) Electrical Engineering led in numbers, with 839, including 420 freshmen. Mechanical had 807, of whom 319 were freshmen who had expressed that preference. The total for Chemical Engineering was 404, including 150 freshmen. Industrial Engineering was the choice of 289; only 63 of them were freshmen, pointing up the fact that selection of Industrial Engineernng was likely to be later in the college course. Including 108 freshmen who had expressed that preference, there were 273 in Civil Engineering. There were 248 in Architecture, 112 of them freshmen.

Old problems and questions had a way of bobbing up again. At the meeting of the 5th of November 1946, Dean MacQuigg stated that the question of terminal curricula at the technical level was again being raised. He also advised the faculty to continue to give thought to the question of entrance requirements. The Engineers' Council, wanting to get back to normality as soon as possible, requested that the biennial Engineers' Day be held in the spring of 1947. That request was denied; Engineers' Day would continue to be in the even-numbered years.

After graduation many of the students would be faced with the necessity of taking the examinations for Engineer-in-Training administered by the state boards of registration for professional engineers. Prof. H.E. Nold, department of Mining Engineering, reported for a committee studying the nature of these examinations and recommending that the Ohio Registration Board invite the faculties of all the engineering colleges in the state to set up similar committees and submit their recommendations on E.I.T. examination questions.

Indications of the esteem in which the College of Engineering was held by alumni and friends were reported by the dean at the meeting in December 1946. Professor and Mrs. William Lloyd Evans--he the "Billy Evans" of the lectures in Chemistry--gave a fund in memory of their son, William Arthur Evans, a 1942 graduate in Mechanical Engineering, to support a scholarship in that department. A bequest of the late Ellis Lovejoy, who had taken the short course in Ceramic Engineering and later had been awarded the professional Ceramic Engineer degree, would establish the Caroline Drew Lovejoy Fund, of more than $7,000 annually named in honor of his mother, whose income/could be used by the College of Engineering for projects thought desirable.

With much of the large enrollment on the G.I. bill and new students coming in, the year 1946-47 hardly showed the usual shrinkage from quarter to quarter. The total for the winter quarter 1947 was 4,354, including 101 in the Twilight School. The number in the spring quarter 1947 was down to 3,915, of whom 102 were Twilight, 11 were special, 3 were auditors, and one was a transient. During the summer quarter 1947 enrollment kept up; there were 1,745 regular students, plus enough Twilight and other to bring the total to 1,799.

Instruction in Mathematics was under scrutiny, as usual. At the meeting in May 1947 the motion passed "that it be the sense of the Faculty that it is opposed to the teaching of Mathematics in large sections and by the lecture system, and that therefore the Faculty instruct the department of Electrical Engineering to arrange with the department of Mathematics to teach Mathematics 608, 609, and 610 in reasonably sized sections..."

Welding Engineering was approved as a separate department in June 1947:

> That the Faculty of the College of Engineering recommend that the Division of Welding Engineering, now a part of the department of Industrial Engineering, be detached from that department, and, together with the welding and heat treating shops, be constituted a department of Welding Engineering....That the degree Bachelor of Industrial Engineering (Welding Engineering) be abolished and a new degree Bachelor of Welding Engineering be authorized.

Dean MacQuigg was elected president of the American Society for Engineering Society
Education at the /meeting in June 1947, and at the meeting the 3rd of July the faculty extended congratulations.

Enrollment in the autumn quarter 1947 was nearly as large as the previous fall. The total was 4,262, of whom 4,120 were regular, 22 were special, one was transient, and 119 were in the Twilight School. Among the 4,120 were 1,155 freshmen (229 of them undecided on what course to take), 1,457 sophomores, 917 juniors, and 567 seniors, as well as 24 in the 5th year. (The fifth-year group included 11 in Agricultural Engineering, 11 in Architecture, one in Chemical, and one in Industrial Engineering.)

Approval of flight training rose a little that fall. At the October 1947 meeting the faculty approved accepting as much as 5 credit hours of flight toward the non-technical requirements of the several curricula. The faculty also approved charging a laboratory fee for each inspection trip course to cover the transportation of the student and his share of the overhead expense.

Tribulations and aspirations of those first two years following the second world war were set forth by Dean MacQuigg in his report to the president in the summer of 1947:

> Starting with the Autumn Quarter of 1945, the enrollment had started to climb, due to the peace-time surge of students. It will be apparent that this build-up in attendance had started even before demobilization had augmented the student body to what it subsequently reached. For example, the total attendance in this College for the Autumn, Winter, and Spring Quarters of 1945-46 was 1070, 1608, and 2091, respectively. However, the number of graduates was not significantly affected, as will be seen by the numbers 8, 9, and 36, respectively, for the same quarters....
>
> While it was evident that an unprecedented wave of students was building up, the departments could only start to prepare for the expected rush because of the lack of definite figures as to its magnitude. Not only was the magnitude of the expected attendance impossible to forecast with with any degree of certainty, but there were also other difficulties in the way of making adequate preparations to handle the anticipated load.

Among these were unavoidable budget limitations and especially the fact that demobilization of the military forces and of industry had not proceeded far enough to make available former staff members who had left the campus for war service of one type or another, or to furnish a pool from which to draw new men for the teaching staff. During this period of unavoidable uncertainty, it was believed that it would be best to err on the side of over-estimating prospective enrollments, rather than to be caught short in preparations. (Subsequent events proved that the most liberal guesses--which at the time seemed fantastic--were exceeded by the reality.) It is small wonder, then, that the period of this report was characterized by elements of change and uncertainty; from this it must not be concluded, however, that progress was arrested by any element of waiting to see what might develop; the time was used to make all such preparations as were possible.

One of the most serious aspects of the problem was that of staff. For example, it has been the experience that government and industry have been able to attract men from teaching positions because of the generally higher salaries...It was decided that the direction of these "raids" might be reversed by emphasizing certain advantages of campus employment...This policy was put into effect with excellent success...

With few exceptions, the faculty who had been given leaves of absence for war duty, either in the military service or in other war work, began to return; and this fact helped to relieve the pressure for experienced teachers.

The enrollment of 2091 attained during the Spring Quarter of the year 1946 was practically the same as the highest previous enrollment. At this time we received the first evidences of the serious space situation which was to develop as the enrollment grew larger and larger. A committee from the Faculty made a detailed study of the future requirements for laboratory, classroom, and office space...

In the Autumn of 1945 our new five-year curricula became effective. Those entering in this quarter without previous college experience were the first students to embark on the five-year curriculum.

In connection with this new five-year curriculum, which varies from the old one in that it embraces additional subject matter of a non-vocational quality, the policy of the college has been to allow veterans to finish under the four-year schedule in all cases where consistent with the governing principles and rules which have been established; this because it is recognized that many of these men have had their education delayed by military service and at the same time have experienced through travel and unusual responsibilities a degree of broadening influence which in some cases might even be beyond the pale of campus disciplines.

> ...Government war surplus property, may, under certain conditions, be made available for educational use. A member of the College faculty was detailed to give this subject his attention, and as a result of his activities the University has received much valuable equipment which it would otherwise have been unable to acquire....
>
> In looking to the future, it was the constant attempt to keep ever in view the several requirements of the University and College policy; namely (1) to accept all properly prepared citizens of Ohio who meet the criteria of priority set by the Board of Trustees, (2) to maintain proper standards of scholarship and professional competence, and (3) to convert the curricula to the new pattern of improved scientific and technical proficiency with the leaven of humanistic studies embraced in the new pattern of engineering education.

Placement, the catalytic procedure of assisting in bringing together graduates in engineering and prospective employers in need of the skills those graduates possess, began in the College of Engineering in a modest way during and just after the second world war. Previously, the matter of suggesting employment to graduates or directing employers to qualified alumni had been almost entirely a personal and rather casual matter, handled by the professors through their own knowledge of graduates and industries. "I'll fight that tooth and nail" was the reaction of one department chairman to an early suggestion of placement as a college activity. During the manpower shortage of the war, however, a sort of centralized arrangement had come into existence, taking part of the time of an employee in one department and involving a few conferences of a faculty committee.

Soon after hostilities ceased, however, Dean MacQuigg in an off-hand way, suggested to Miss Lilyan B. Bradshaw, assistant to the dean, that she might look after what centralized placement activity there was. From that informal suggestion has developed the Placement Office of the College of Engineering with Miss Bradshaw as director. In the brief report dated June 1946, Miss Bradshaw stated that 44 companies from a wide range of localities had sought help in locating qualified employees. Also, a number of alumni, recently released from military service, had registered in the College office. For the first three years these reports on placement activities were on the College letterhead. In the 1949 report the Placement Office had its own letterhead.

In meeting the 6th of November 1947 the faculty heard a report of the Building Committee:

> Some thought had been given to the idea of placing the whole college in one large building....and the site between Woodruff and 17th Avenues, from Neil Avenue east onto the Quadrangle, had been proposed.

At that meeting the faculty approved the degree Bachelor of Petroleum Engineering for those who should complete the curriculum in petroleum engineering administered by the department of Mine Engineering, effective in the academic year 1948-49.After listening to the report of the committee on the responsiblity of the College toward review facilities for the E.I.T. examinations, the faculty concluded that:

> (1) The average student ... would need to do some reviewing of certain parts of his college work, particularly the basic underlying subjects, such as mathematics, physics, chemistry, and mechanics, with perhaps lesser emphasis on the technology he has studied so intensively during the last two years in college.
>
> (2) It would be unfortunate if the College should get the reputation of conducting or sponsoring review courses for the purpose of preparing our graduates to pass E.I.T. examinations...Therefore, the initiative for organizing and conducting review classes in Columbus should rest with the Franklin County Chapter of the Ohio Society of Professional Engineers.
>
> (3) Some faculty members have assisted and will continue to assist....in the preparation of E.I.T. examination questions. "Your committee feels very strongly that no instructor who assists in writing examinations or in grading examinations should coach graduates to pass the examinations."
>
> (4) Members of the instructional staff who have no contact with either the preparation or the grading of the examinations might ethically accept employment as review instructors...operating as individuals...
>
> (5) Review classes should be held....off the campus...

Approval was announced at the meeting the 6th of January 1948 of a recommendation that for the combined bachelor's and master's program, a student must have a total point-hour ratio of 2.75, both in his major field and also in his general studies. The Executive Committee was instructed to adhere to the rule that freshmen in the four-year program must have a cumulative point-hour ratio of at least 1.5; sophomores must have a cumulative of 1.7, and juniors a cumulative of 1.8. Fourth-year students must have a cumulative of 2.0, this ratio to be computed on the record in mathematics, physics, chemistry, drawing, and mechanics, and the 600 and 700 courses in the degree-granting departments in which the student was majoring. Moreover, "Students who fail to reach the point-hour ratio enumerated above are deemed to have shown insufficient progress and are to be dismissed." The required 1.8 point-hour ratio at the end of the 9th and subsequent quarters was to be computed on courses in the Engineering College departments, excluding Survey of Engineering, and in chemistry, mathematics, and physics. The Executive Committee could substitute advanced R.O.T.C. and N.R.O.T.C. for any combination of electives.

Another rule the faculty adopted in that winter of 1948 was that students who had failed any course twice must receive permission from the department giving that course before undertaking the subject for a third time.

How to meet the question of degrees with honors or distinction came up. The question was complicated by the ramifications of the five-year program. There was a feeling that "Students who achieve the master's degree in five years do, in effect, graduate with distinction." Also, "Those who do not elect to proceed with the master's program, though eligible, should not be specially recognized when other students who follow the more difficult program are not so honored." Further complicating the question of honors was the unanswered question of the attitude that industry would take toward the five-year bachelor's-master's program.

Moreover, on the question of honors for graduates, it was pointed out that there were college honorary organizations, such as Tau Beta Pi, and departmental honorary societies, such as Eta Kappa Nu, and they may afford sufficient recognition. The faculty approved a recommendation that any action on the question of awarding degrees with honors or distinction be deferred until experience with the five-year program would show whether or not achieving the master of science degree is a sufficient honor. There should be no action before June 1950 when the first class under the five-year program would complete work.

April 1948 was marked by the announcement that $5,300 had been raised for the John Younger Memorial Scholarship Fund, and the first $300 scholarship would be awarded for 1948-49. Also, in April 1948, Dean Emeritus Embury A. Hitchcock died. At the June meeting the faculty heard a memorial to the late dean praising his many qualities, particularly his standing as a "human engineer." Hitchcock Hall, dedicated in the spring of 1967, is his memorial on the campus.

Ethics and other matters of professional interest were discussed in meeting the 6th of May, 1948. The faculty was informed that an organization of student engineers was an excellent forum for discussion of such questions, and that such an organization was in existence on the campus as the student chapter of the Ohio Society of Professional Engineers. Since a favorable attitude of the faculty was essential for the success of this organization, the motion was made that "A standing committee of this faculty should be established and appointed whose purpose it is to actively cooperate with the Student Chapter without directing it, for the purpose of developing proper professional attitudes in the greatest number of engineering students." Further, this committee "should also see that the students are properly informed of the procedures and mechanisms of engineering registration in Ohio and other states."

This motion to establish a standing committee " to advise, cooperate with, and more or less quietly direct the activities of the Student Chapter of O.S.P.E." was defeated.

However, the faculty agreed to endorse the establishment of the student chapter of O.S.P.E., together with its aims and objectives, and to request the dean to include not less than six lectures on engineering ethics in his senior survey course.

It was then moved that the faculty "give our sanction and backing to all other student engineering organizations which have been established through the years." This motion was tabled until it could include detailed information on all those organizations. They were named in the meeting of the 7th of October, 1948, and the faculty voted to give them its encouragement and backing. The list of recognized technical organizations so approved for the students is as follows:

Pi Mu of Pi Tau Sigma
Phi Lambda Upsilon
Society of Automotive Engineers
Texnikoi
Tau Beta Pi
Electrical Engineers' Graduate Club
Eta Kappa Nu
Engineering Physics Society
Engineers' Council
Student Chapter, American Institute of Industrial Engineers
Keramos
American Institute of Mining and Metallurgical Engineers
American Institute of Electrical Engineers
American Welding Society
American Society of Agricultural Engineers
American Society of Civil Engineers
American Society of Mechanical Engineers
American Institute of Chemical Engineers
American Institute of Architects
American Foundrymens' Association
Ohio State Student Branch, American Ceramic Society
American Society of Military Engineers
Ohio State Engineer
Ohio State University Chapter, Student Affiliates, American Chemical Society
Ohio Society of Professional Engineers, Student Branch
Quadrangle Jesters
Women Student Architects and Engineers
Theta Tau Fraternity
Triangle Fraternity
Theta Xi Fraternity
Sigma Gamma Epsilon
Association of Landscape Architects

Professional degrees, which any graduates might qualify for by making application to the departments and arranging to submit an acceptable thesis, were coming under closer scrutiny. In June 1948 the Committee on Professional Degrees was asked to bolster future recommendations with additional information--date of graduation, undergraduate point-hour ratio, and titles of theses.

Fall 1948 marked the 75th anniversary of beginning classes at The Ohio State University, and there was talk of the contribution of the College of Engineering to this celebration. The College part of the celebration took place during the week beginning the 24th of January 1949, with presentation of a large number of papers on such subjects as engineering research by Dean Elect W. L. Everitt of the University of Illinois, the history of Engineering Drawing, and development of engineering education. These papers were published in a single issue of the Engineering Experiment Station News.

Students were apparently taking advantage of the five-year curricula; in the fall of 1948 there were 232 enrolled in the 5th year. Total enrollment in the Autumn Quarter 1948, was 3,572, including 662 freshmen, 775 sophomores, 1,158 juniors, and 745 in the 4th year. (However, the total enrollment included 1 transient and 163 in the Twilight, all listed as being in the fifth year.)

Squeezing both the bachelor's and the master's work into five years (or a total of 15 quarters) must have been a difficult for even bright students, and the department of Metallurgy was granted permission, at the meeting of the 4th of November 1948, to require an extra term of work between the fourth and the fifth years for candidates for the master's. At that meeting the faculty decided to devote an evening session to a consideration of "Engineering Education--Plus" by Dean MacQuigg in the September 1948 issue of the Journal of Engineering Education, but the College minutes do not show a special meeting for that purpose.

Mathematics for the engineering students was a perennial subject of discussion. A progress report of the Mathematics Committee in December 1948 presented one idea that was being kicked around: to introduce calculus into the freshman year. An obstacle mentioned was that less mathematics was being required in the high schools. Another suggestion was concentrating the freshman mathematics by requiring 8 hours in the subject throughout the year, giving algebra and trigonometry in the first quarter; trigonometry, analytical geometry, and calculus in the second quarter; trigonometry, analytical geometry, and calculus in the third quarter; postponing English to the 5th and 6th quarters.

Marion L. Smith, of the department of Mechanical Engineering "sat with the faculty for the first time" in the meeting of the 10th of March 1949. He was to become associate dean of the College in 1958. At the April 1949 meeting the faculty discussed at length the policy of students' rating teachers and courses.

Professional degrees got lengthy discussion in the spring meetings of 1949. The hope was expressed that the details carried in the College bulletin about procedures for applying for the professional degree could be eliminated. Statements on the subject included the opinion that "too many poor sticks" had received professional degrees and that registered professional engineers used a similar designation. The faculty voted that the 1949-50 Bulletin should carry only an announcement of the availability of the professional degree, but no details.

At the meeting the 2nd of June 1949 the faculty passed a motion to the effect that the number of credit hours required for graduation in the engineering curricula should be 261 plus or minus 3, plus the University requirements in Military Science, Physical Education and Hygiene for students who carry those courses, and that this requirement should become effective at once. The Council on Instruction was asked to approve the degree Bachelor of Petroleum Engineering for students completing that curriculum.

Harry E. Nold, professor of Mine Engineering, made a statement in the meeting of the 6th of October 1949 that foreshadowed the action nearly twenty years later establishing advanced professional education in Engineering. He reported on an A.S.E.E. conference feeling that study for the Ph.D., with its emphasis on creative research, does not meet the needs of many practicing engineers. The suggestion was for something higher than the master's in the practical field.

In meeting the 2nd of February 1950, the faculty resolved to create the School of Architecture and Landscape Architecture, replacing the department of that name. Another action of that meeting was that a student taking the combined program might qualify for a bachelor's degree in one department, for a master's in the field of specialization in another department.

Professional degrees, subject of scrutiny over a considerable period in the late forties, were put on an entirely different basis in 1950. The graduate who aspired to qualify for such a degree had formerly been the initiator of movements in that direction, though some departments made a practice of reminding the bachelors of the possibilities. The faculty adopted a report putting the initiative entirely on the departments; they could select graduates who might qualify, on a sort of honorary basis. The college committee would pass on all suggestions and approve or reject--though a department might appeal a rejection. Among the qualifications was at least eight years' experience following graduation. The candidate must be an upright, loyal, responsible citizen. His thesis was to be based on his own engineering experience and accomplishments, and was to be satisfactory to the department granting degrees in his specialty. The report, finally adopted in March 1951, repealed "all previous contrary legislation."

Further consideration of making doctoral programs more practical came during the year 1950. The faculty, meeting in May 1950, decided that assistant professors might be enrolled for graduate work. A proposal for graduate study programs leading to the degrees Master of Engineering Sciences and Doctor of Engineering Sciences was defeated at the meeting of November 2,1950.

Two former acting deans died during 1950 and were formally memorialized. James E. Boyd died the 10th of May, 1950, and Edwin F. Coddington the 21st of December. Boyd's services were recognized in 1967 in naming the Boyd Laboratory. The memorial to Dr. Coddington referred to his services, as professor of geodetic engineering, in setting the "Latitude Stone" marking the 40th parallel of Latitude. This stone had been originally located in 1881 by Professors McFarland and Mendenhall, using an ordinary surveyor's transit. In 1932, when the roadway between University Hall and the Library was changed, Dr. Coddington relocated the stone, using a modern theodolite. The new location was reported as "just 16 feet north of the original location."

Evaluation of the combined master's-bachelor's program in a five-year schedule was reported at the meeting the 5th of April 1951. The statement was made that there " seemed to be general dissatisfaction with the present operation." It was felt that the curricula were overcrowded, and more individualized programs were needed. At the meeting in June 1951 a majority report of the evaluation committee recommended bringing the five-year program to an end by accepting no applications for the combined program after the first of June--already passed-- and that students already in the program be allowed to complete their work provided they could finish before September 1953. The minority report, Dr. Joseph H. Koffolt of Chemical Engineering standing alone, urged that the program be continued, with the master of science degree to be granted for completing a mininum of 45 hours in course and thesis not required for the bachelor's, with at least one full quarter extension of the time requirement. These proposals were discussed during the following fall and winter. In October 1951 a motion to drop the five-year program failed--19 votes to drop, 28 to retain.

Proposals for modifying the combined five-year program included permitting students with superior records to petition to be registered in the Graduate School, and various arrangements to allow concentration on graduate work in the last three or four quarters of a total of 16 to 18 quarters. The whole question was referred to the Committee on Engineering Instruction.

Finally, early in 1953, questionnaires were sent to the various departments asking for opinions and recommendations. A progress report to the faculty in May 1953 disclosed that 73 replies from 13 departments showed a majority favoring continuation of the combined program, with improvements. Three-fourths of the replies expressed a preference for 16 quarters or more to complete the requirements for both degrees, and two-thirds felt that two or more quarters should be devoted exclusively to graduate work. Measures to strengthen the combined program, in a total time of 16 quarters or more, continued to be reported to the faculty from time to time.

Rules for conducting faculty business were approved in meeting the 3rd of May 1951. They spelled out membership, and specified fifteen per cent of faculty present as a quorum. Ordinary business could be transacted by a majority vote; items involving censure would require 75 per cent vote. Non-controversial matters, such as recommendations for degrees, would not require the presence of a quorum. *

Mine Engineering, a department that had been in existence (with Metallurgy) since the School of Mines was established in 1877, independent of Metallurgy since 1896, had its name changed by faculty action in January 1951 to the department of Mining and Petroleum Engineering.

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*Revised rules were adopted in April 1958, specifying 35 voting members as a quorum. At the meeting the 16th of October 1968, adding voting members from the departments of Physics, Mathematics, and Agricultural Engineering, a recommendation for student memberships on various college committees was adopted.

Spring 1952 was a sad time for the College of Engineering. Dean C. E. MacQuigg, who had presided at the faculty meetings of the 6th and 11th of March, became ill that month. He lingered for several weeks, but died the 24th of April.

Minutes of faculty meetings that spring show that they were presided over by J. L. Carruthers, "dean pro tem." Professor John L. Carruthers, chairman of Ceramic Engineering, was one of a committee of three that administered the College of Engineering. The other two were Professors E. E. Dreese, chairman of Electrical Engineering, and Lawrence D. Jones, of Engineering Drawing, secretary of the College.

Professor Jones called the faculty to order the 28th of May to receive the report of the committee on a memorial to the late dean. A departure from ordinary procedure was the invocation by Dean MacQuigg's pastor, the Rev.Almus Thorp of St. Stephens Episcopal Church. Another departure was a memorial by the Engineers' Council representing the student body:

> Thursday, 24 April 1952, marked the end of the brilliant career of our beloved Dean of The Ohio State University College of Engineering...Dean Charles E. MacQuigg will long be remembered as a great educator and sympathetic counselor. Many men have risen to like positions, but few possess the qualities which made him so loved and respected by his associate faculty members and the men of the student body...Dean MacQuigg was more to the students than Dean of the College of Engineering.. He was like a father to all engineering students...Charles Ellison MacQuigg will be remembered by his students as a personal friend as well as a great educator...

Dean MacQuigg had been active in many educational and civic enterprises. He was vice-president of the A.S.E.E. in 1942, president in 1947. During the war he was regional adviser in the ESMDT and ESMWT programs. He had served as chairman of the Ohio Water Resources Board. He belonged to the Newcomen Society and was a fellow of the Ohio Academy of Science. His services at The Ohio State University were recognized in the dedication of the MacQuigg Laboratory of the College of Engineering in May 1967.

Action of the Board of Trustees made Secretary Lawrence Jones acting dean of the College, October 1, 1952 through June 30, 1953. Acting Dean Jones presided at the faculty meeting the 2nd of October, 1952, and Prof. Jesse Huckert of Mechanical Engineering was secretary pro tempore. George M. Lawrence, an assistant professor of Electrical Engineering, appears in the minutes of that meeting as assistant to the dean. Professor Lawrence had been called on to assist ailing Junior Dean W. D. Turnbull. In addition to service as assistant to the dean, Professor Lawrence prepared the minutes of a number of faculty meetings as acting secretary. In 1954 he was appointed assistant dean and secretary of the College.

Senior Survey, "the Dean's Course," was scheduled as usual for the first quarter 1952-53; the remaining two quarters the degree-granting departments could arrange seminars on problems facing the seniors in those departments. Following the appointment of a permanent dean in 1953 the survey courses were resumed. They were discontinued in 1959-60, and the Placement Director noted that year that lack of assembly interfered with bringing employment information to the attention of the entire class.

Performance of students in their mathematics courses occupied much of the attention of the faculty during the fifties. Solid geometry as an entrance requirement came under fire in the fall of 1952. Some called it "an artificial ... requirement." Prof. Ralph Paffengarger of Engineering Drawing presented statistics showing that students who had had solid geometry in high school did better in their university studies than those who had not. Solid was retained as an entrance requirement. In later discussions there was some sentiment for urging that high school credits might even include calculus, but the department of Mathematics took a dim view of the proposal. Placement tests in mathematics were reported as a more reliable indication than high school math grades of the probability of success in college. A

December, 1955, report of a special committee on Mathematics Entrance Examinations declared "The committee feels that a sound preparation in algebra is the most important assurance of success in collegiate mathematics." This observation echoes the report of the University president, Edward Orton, in 1878, that dropping algebra as an entrance requirement the previous year had been a mistake, permitting unqualified students to come in, and restoring it made the new class better, even if smaller.

Technical institute training for students who were unable to make the grade for education as engineers was recommended by a committee in March 1953. It was proposed that:

1. A technical institute division giving courses leading to a certificate of proficiency should be set up on the campus under the supervision of the College of Engineering.

2. The division should be organized immediately and the program should be started as soon as possible.

3. At first, the courses should lead to only one certificate--probably in drafting--and additional curricula should be added as needed.

"A proposal for establishing an Ohio State Technical Institute" was given to the faculty by the Executive Committee at the meeting of May 21, 1959. Demand for persons in "occupations which lie intermediately between the scientific professions and the skilled crafts" was cited. It was proposed that

1. A new division of The Ohio State University be established known as The Ohio State Technical Institute to be administered by the dean of the College of Engineering.

2. Operation to be the responsibility of the Director of Technical Institutes, reporting to the dean of the College of Engineering.

3. An advisory council be appointed by the president to guide the dean in establishing policies governing the institute program. Typical subjects to be electrical technology, building construction technology, mechanical design technology ....

After discussion, this proposal was approved, and the dean was requested to recommend to the president and Board of Trustees that it be implemented.

Paraphrasing an old French proverb, the faculty proposes, the Board of Trustees disposes. A decade after the first proposal that a technical institute be established, at the faculty meeting the 2nd of April, 1963, it was reported that the matter had been tabled for lack of funds. By then ten schools for technicians had been established in Ohio under the guidance of the State Board of Education. The matter was still under study. Technical education to fill the gap between the engineer and the skilled craftsman continues to receive attention. In the summer of 1969 a technical institute under community auspices was authorized to operate on property of the Ohio State University branch at Mansfield.

Meeting in March 1953, the Engineers' Council unanimously requested the Engineering College faculty to award degrees with honors because:

1. A degree with honors separates the superior student from the ordinary and gives him an eminence of unquestionable reputation.

2. The combined program leading to a master's is not an adequate substitute because many men of high caliber do not choose to enter this program.

3. Honorary societies, such as Tau Beta Pi, are not official and do not appear on the diploma or college records.

4. Engineering is the only college at Ohio State not awarding degrees with honors.

5. Purdue, Wisconsin, and other colleges award degrees with honors to engineering graduates.

Student logic pravailed. A committee of the faculty picked a minimum point-hour ratio of 3.4 for cum laude and 3.7 for summa cum laude.

Frank C. Caldwell, who had served as acting dean 45 years earlier, died in the summer of 1953. That fall the faculty recognized his passing in the usual gracious memorial.

Gordon B. Carson assumed office the first of July, 1953, as dean of the College of Engineering. He was a mechanical engineering graduate of Case Institute of Technology, class of 1931, and had received a master's at Yale there in 1932, the Mechanical Engineer degree/in 1938. Carson had taught mechanical engineering at Case 1932-44, advancing through the academic grades, and had had a great deal of industrial experience, most recently as executive in a large manufactory at Portsmouth, Ohio.

Closer alignment of the College of Engineering with industry was emphasized by Dean Carson at the faculty meeting the first of October, 1953--each getting to know the other to develop mutual assistance. Another objective was informing the general public of the purposes, problems, and achievements of the college, a project in which all faculty members could help. The College office would have biographical information and records of accomplishment of members of the teaching staff for release to news sources when appropriate. Early in the administration of Dean Carson, faculty members were urged to qualify for professional registration as engineers in their respective fields, and the letters P.E., standing for professional engineer, were put registered after the names of/members of the staff in the college publications.

All media were to be used to inform the public about the College. A committee investigated presentation of faculty activities on radio and television programs. Slides and motion pictures were prepared. "Student speaking teams" organized during 1953-54 told service clubs, high school students, and others about the profession of engineering and the work of the College. This activity grew into the Engineering Speaking Society, a fully recognized student activity. A motion picture, "Engineering for Eddie," was shown widely. The Engineering Experiment Station News, a modest little magazine which, since 1929, had been publicizing projects of the Engineering Experiment

Station, became the quarterly News in Engineering, in format large enough for impressive pictures and/the fulfillment of mission of reporting activities of the entire College.

Alumni of the College of Engineering were to be recognized in an annual alumni day with an invitation to return for a visit to alma mater. The first Engineering Alumni Day was the 7th of May, 1954. Charles F. Kettering, the most distinguished alumnus of the College, spoke in the opening session, and the luncheon speaker was opinionated, outspoken Admiral Hyman Rickover, "father" of the nuclear powered submarine. The various departments of the College scheduled programs and reunions. This first alumni day was the forerunner of "ACE," the Annual Conference for Engineers and Architects, that draws hundreds of former students and friends to the College for programs telling of plans and achievemnnts of the College. With authorization of the faculty, the dean organized the Committee of One Hundred for Engineering, a large group of active alumni who are interested in furthering the progress of the College.

ACE Day is recognition day. The first Distinguished Alumnus Awards were presented at the 1955 meeting, and similar recognition has been given to a maximum of five graduates at the annual gatherings since then. Another award is that of Texnikoi, the honor society for activities in the College, that is presented to a young alumnus for achievement. The Lamme Medal, presented to one or two alumni for meritorious achievement in engineering, is also awarded on ACE Day; it was made possible by a bequest from Benjamin G. Lamme, M.E. class of 1888, who became a distinguished electrical engineer. The Lamme Medal was first given in 1931. / Scholarship among undergraduates in the College is also recognized during this academic festival.

Through ACE Day 1969, recognition as Distinguished Alumnus had been given to 73 graduates of the College, and the Lamme Medal had been awarded to 42. The Ohio State University had awarded honorary doctorates to 32 engineers, most of them educated at Ohio State.

Commenting on a report of the American Society for Engineering Education, a committee of the College of Engineering declared in the spring of 1954 that it was "unrealistic" to designate "outstanding schools" by a star. Instead:

> The critical measure of a school's accomplishments is the performance of its graduates.

*That committee was opposed to a suggestion for "bifurcation in engineering education" into "professional-scientific and professional-general," averring that "any further subdivision or increased specialization in undergraduate curricula which would increase the number of degrees offered would be highly undesirable." Faith in the Ohio State set-up was affirmed:

> Having had eight years of experience with the five-year undergraduate curricula, we recommend this as the most effective way of meeting the need of technical advances. Humanities, broadening courses, fundamental sciences, and languages should be carried through the curricula concurrently.

Engineering Mechanics was approved in the spring of 1954 as the proper style for the department of Mechanics. In the fall of 1954 the name of the department of Metallurgy was changed to department of Metallurgical Engineering.

The University Trustees in meeting the 10th of May, 1954, appointed Lawrence D. Jones associate dean and secretary of the College. Dean Carson announced at the June meeting that, beginning the first of October, the College would have another associate dean, Professor Harold A. Bolz, head of the department of General Engineering at Purdue, and that George A. Lawrence would become assistant dean. A new faculty member at the October meeting was Edward Q. Moulton of Civil Engineering; he would later become a member of the University administration as secretary of the Board of Trustees, and in 1969 he was named vice-president.

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*Further reporting on the A.S.E.E. committee evaluation of engineering education, the Ohio State committee "forcefully" stated that "The most important goal of engineering education is to motivate the student to learn on his own initiative."

Junior Dean W. D. Turnbull, aged 70, retired in 1954. He died the following year, and in meeting the 6th of September 1955, the University Board of Trustees expressed this appreciation of his work:

The Board of Trustees expresses its sorrow at the death of William Davis Turnbull, Junior Dean Emeritus of the College of Engineering, on August 25, 1955.

Dean Turnbull was born in Ironton, Ohio on December 5, 1883 and graduated from the College of Engineering at the Ohio State University in 1908 with the degree of Civil Engineer. Following two years of professional experience as Assistant City Engineer of Ironton, Ohio; City Engineer of Cattletsburg, Kentucky; and Assistant County Engineer at Painesville, Ohio he returned to his Alma Mater in 1910 as an instructor in the Department of Engineering Drawing. He was appointed professor in that department in 1923. His ability as a draftsman, particularly in the art of lettering and illumination, gained for him national recognition. He was responsible for the production of the "Official Highway Map of Ohio." He assisted in preparing "The Base Map of Ohio" and "Geologic Map of Ohio." He contributed to the first edition of the internationally famous textbook, ENGINEERING DRAWING--Thomas E. French, and was also co-author with the late Professor French of "Lessons in Lettering"—Books I and II. His illuminations, chief of which were his contributions to the book presented to the late Dr. W. O. Thompson upon his retirement as President of the University, are considered among the finest ever produced anywhere.

As a teacher, his keen sense of humor, coupled with his outstanding ability and his phenomenal memory, gained a position of great respect and admiration among his students. His debates with the late Professor C. E. Sherman, Chairman of the Department of Civil Engineering were recognized as "classic renditions" by all students and faculty who heard them at the annual Engineers Round-Up.

Dean Turnbull became Secretary of the College of Engineering in 1922 and served the College in this capacity while teaching full time in the Department of Engineering Drawing until 1928 when he was made Junior Dean of the College. He then devoted his full time to this position until his retirement in 1954, except for one year, 1936, when he served as Acting Dean of the College.

As an administrator, Dean Turnbull was extremely well liked by the students in the College of Engineering because of his kindliness, his keen interest in their problems, and helpful counsel.

Dean Turnbull was a past president of the Faculty Club, Charter Member of University Masonic Lodge, Member of American Society for Engineering Education, American Academy of Political and Social Science, Tau Beta Pi, Sigma Xi, and Acacia Fraternity.

* * *

In campus and community life he was an active and helpful associate and neighbor; his forty-five years of continued and devoted service to this University have been greatly cherished by the faculty, administration, students, and alumni who have had the privilege of working with him.

On behalf of the entire University, the Board of Trustees expresses to the family its deep sympathy and sense of understanding in its loss. It is directed that this resolution be inscribed upon the minutes of the Board.

Nuclear Engineering, a three-hour course in physics to "include the necessary basic physics and selected topics on reactor technology" was announced in faculty meeting the 3rd of February 1955. Later, additional courses were arranged, and the departments in the College of Engineering might restudy their curricula to include them as requirement or elective. The consensus, however, was that Nuclear Engineering as another major engineering discipline was not warranted at the undergraduate level.

From time to time the question of nuclear engineering kept recurring. Late in 1964, Interdisciplinary Graduate Programs in Nuclear Engineering were announced, responsibility for organizing them in the department of Mechanical Engineering. Dr. Donald D. Glower would lead in developing programs, courses, and research to provide a core of courses for graduate students. Holders of bachelor's degrees in any engineering discipline, or in physics or chemistry, might qualify for these programs.

Throughout the fifties matters of student scholarship and trouble with studies, particularly mathematics, continued to engage the attention of the faculty. Out of this attention to student performance the idea emergdd that there should be two divisions of the Collgge of Engineering. The first two years would constitute the Lower Division, the remaining three years the Upper. Discussion included such statements as:

> A mechanism is needed whereby a student completing his second year in Engineering can be advised, with greater assurance than is now possible, of his probable success in completing his degree and in becoming successful as a professional engineer.

Representatives of the University Counseling and Testing Center appeared at some of the faculty meetings to discuss methods of discovering the probable success of a student in advance of his commitment to programs in engineering. There were interviews with faculty members, interviews with representative students, and discussions of tests and interpretation of the results. Performance in comprehensive examinations in mathematics, physics, chemistry, mechanics, engineering drawing, and English was suggested as one requirement for admission to the Upper or Professinnal Division of the College. There was reference to a policy of "selective admissions."

Since Engineering was a professional college, there was recurring talk that prospective students might first be required to qualify by taking, with good performance, certain pre-engineering courses, perhaps in the College of Arts and Sciences.

Engineering was described as more and more dependent on basic sciences, and it was asserted that

> It has been demonstrated that success in basic science courses is reliable evidence of engineering ability. *

Accordingly,

> It is proposed to utilize the first two years of college work in these subjects as a criterion for selection of those who can benefit from professional work. Comprehensive review examinations at the end of the second year are desirable....

Arguments for the hurdle of comprehensive examinations included the statement that it would:

> Force the student to organize, and, to a certain extent, to integrate his background preparation.
>
> Result in a much more uniform; and higher quality student population in the Upper Division.
>
> Serve as a means of restricting the enrollment to a number commensurate with the facilities and staff of the college.

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*Emeritus Prof. P. W. Ott of Mechanics, who was involved in a number of the experiments to improve instruction in mathematics, commented in 1969 that though a few gifted students profited, "the run-of-the-mill students were better served by the old established methods. Any kind of aptitude testing with meaning spreads the students out under the well-known bell-shaped probability curve. The students at the upper end cannot be stopped; those at the lower end cannot be started; and the 67-odd per cent in between can learn under the guidance of patient, wise, and understanding teachers. I never found a good formula for getting and keeping teachers of this kind...Practicing engineers, with some rare and wonderful exceptions, simply do not use the calculus at all in their work, but I still remain convinced that, without calculus, there can be no true understanding of much of the engineering course content...My conclusion after forty years of teaching is that education is a sovereign remedy for ignorance but not even a palliative for stupidity."

Facilities and staff to meet the needs of the large numbers of students who were expected to enroll in engineering had to be anticipated and provided for. At the December 1955 meeting of the faculty, Professor E. E. Dreese for the Executive Committee presented "A Ten Year Plan for the College of Engineering," proposed as a framework for growth and development of the College of Engineering during the ten-year period 1955-1965. The mission of the College included five objectives:

1. To educate, as engineers for professional life as well as well rounded citizens, all of the sons and daughters of Ohioans who are well qualified for engineering, and who seek admission....

2. To attract to engineering because of the excellence of our instructional and research program top caliber students...

3. To provide basic technical and scientific research and development leadership for industry.

4. To explore and develop vigorously, through high level graduate work, the engineering frontiers of our world.

5. To develop further a faculty team which is well balanced in creative thinking and productive scholarship under an aggressive leadership.

This "plan" included estimates on enrollment year by year, and requirements in staff and physical facilities to meet the responsibility of teaching those students who were expected to present themselves. Enrollment in the autumn quarter 1954 was 2,496. The projected enrollment figure for 1955 was 2,928 (the report appeared before enrollment figures were available) and that for 1960 was 4,450. For 1965 the figure was 5,770, and for 1970 it was 6,980. Anticipated enrollment was based on the "conservative assumption" that no greater percentage of youths of eighteen would undertake careers in engineering in the future than were currently doing so.

Current facilities of the College would require a cut-off in enrollment at about 3,500. The proposal for an Engineering Center, with the largest unit at the corner of Neil and Woodruff Avenues and extending to the east beyond the

Engineering Experiment Station Building, would take care of the needs of students up to an enrollment of about 6,050, the estimated number that might be expected by 1966. Space in the center was allowed for a Library of the College of Engineering. Appearing before the College faculty meeting the 6th of May 1954 the Director of University Libraries had mentioned the duplication in reference books in the/branch[16] or departmental libraries on the campus, of which seven were in the engineering buildings. He proposed that

> When possible there be a central engineering library of 125,000 volumes with 400 seats and 50 cubicles...Such a library could have five or six trained librarians and could be opened over 80 hours per week.

In the decade and a half since the plan was presented, much of the Engineering Center has taken tangible form. The buildings extend from the Electronics Laboratories and Systems Engineering west of Neil Avenue, eastward, taking in the Engineering Experiment Station building (renamed Haskett Hall, in honor of the first chairman of the department of Photography) and the laboratories for Chemical Engineering, Metallurgy, and Mineralogy through Watts Hall, named in honor of Arthur S.Watts, long-time chairman of Ceramic Engineering. Other structures in the Research Center about a mile west of the main campus house facilities for electronics and communication research. All these new facilities represent an investment of more than twenty-million dollars. The proposed central engineering library, however, has not materialized.

"A distinct shock" was the reaction of the University and College Administration to the news, in the fall of 1954, that, following a visit of an accrediting committee of the Engineers' Council for Professional Development, the curriculum in Petroleum Engineering was not accredited, and E.C.P.D. had accredited the curriculum in Mining Engineering provisionally for two years only. This blow had been followed ~~shortly~~ in March 1955 by the resignation of Prof. Tell Ertl, chairman of the department of Mining and Petroleum Engineering. Following much high-level deliberation, the Executive Committee had recommended that the curricula/in Petroleum Engineering be transferred and staff to the department of Chemical Engineering, where the Petroleum Engineering degree could be administered, and that the sole-remaining instructor in Mining Engineering be transferred to the Department of Metallurgical Engineering. (Mining had been separated from Metallurgy nearly 60 years before.) Such action required discussion in faculty meeting, and Dean Carson presented the proposals and the reasons for them the 29th of February 1956.

Opposition was registered to this loss of identity of the department by Professor Emeritus Nold, long-time chairman of Mining, and Prof. E. V. O'Rourke who had developed the program in Petroleum Engineering. The historic nature of the department, established in 1877, as the School of Mines, was cited. A secret mail ballot was demanded, "so that you can vote freely."

Statistics, principally the small enrollment in the curricula and the necessity to add instructors at considerable exepnse, constituted the major arguments in favor of dissolving the department. Students in mining constituted less than one per cent of the College enrollment. The result of the balloting by mail was 77 for approving the recommendation of the Executive Committee, 35 against. The Board of Trustees approved, and the department of Mining and Petroleum Engineering was discontinued the 30th of June 1956.

Even in the new ~~allocations~~ arrangement, the curricula in Petroleum Engineering and Mining Engineering failed to atrract students. In meeting the 6th of December

1961, the College faculty voted to abolish the curriculum and degree in Petroleum Engineering, though a petroleum program was retained in the department of Chemical Engineering. In the fall of 1961 the mining industry of Ohio was given three years in which to interest qualified students to enroll in the Mining Engineering course. The expected increase in students did not materialize. There were various reasons: More and more mining operations were of the open-pit type, requiring engineers with proficiency in such fields as civil, mechanical, and electrical engineering. Accordingly, at the November 1964 meeting, the faculty approved the recommendation that:

> No students be admitted to the ProfessionalDivision in engineering to enroll in the first year of the mining engineering program effective immediately...No students be admitted tothe Graduate School to enroll in mining engineering effectively immediately....Mining engineering courses, as needed for electives, be transferred to, administered, and taught by the department of Civil Engineering...And that the Mining Engineering Division of the department of Metallurgical Engineering be abolished and the Mining Engineering be dropped and removed from the University bulletin not later than July 1966... Awarding of the degree Bachelor of Engineering in Mining (BEM) be discontinued after the summer quarter 1967.

Thus, just ninety years after the School of Mines was established, causing the abolition of the professorship of Politidal Economy and Civil Polity, it ceased to exist as an integral part of the University.

When he had been dean of the College of Engineering three and a half years, Gordon Carson was invited to tell the Board of Trustees of the Ohio State University about the state of the College. As recorded in the minutes of the February 11, 1957, meeting of the Trustees:

> President Fawcett stated that he had asked Dean Gordon E. Carson of the College of Engineering to be present at this meeting to inform the Board as to the status of the College of Engineering.
>
> Chairman Huffman then requested Dean Carson to present his report and also to prepare and present to the Secretary a summary of his remarks to be included in the minutes of this meeting.
>
> *Summary of Remarks on the College of Engineering Addressed to the Board of Trustees of The Ohio State University by Dean Gordon E. Carson, February 11, 1957:*
>
> The College of Engineering had an Autumn Quarter enrollment in 1956 of 3511 students, of which 29 were women. It thus had the largest male enrollment and the smallest female enrollment in any of the colleges of the University.
>
> The quality of the freshman class entering in the Autumn Quarter of 1956 was better than any of the classes in recent years, insofar as the measurements in the placement tests and the Ohio State Psychological Examination were concerned. In this class 81% passed the mathematics placement tests, and 89% passed the English placement tests or achieved proficiency in English. These were the top figures among colleges for the entire University. The picture in the Ohio State Psychological Examination was also good, with 39% of the students in the College of Engineering in the upper quarter, while only 8% were in the lower quarter, based on the University-wide tabulations.
>
> It was pointed out that the graduate program of the College of Engineering is supported in large measure by the research efforts of the college, and 325 students are now enrolled, with Electrical, Chemical, Mechanical and Metallurgical Engineering supplying the largest percentage of these students.
>
> The College of Engineering committee organization was explained and the interrelation of these committees in carrying out the work of the college was covered. The faculty of the College of Engineering was commended for its effort in the direction of improvement of quality and cooperative endeavors in solving the curricular and instructional problems within the college.
>
> The greatest crisis in years in the College of Engineering has been precipiated because of the unprecedented demand for engineering graduates. This year more than 1500 recruiters from industry, research, and government will seek the services of the "estimated" 291 graduates. Starting salaries are the highest ever, with $474 per month the average figure to date, and $481 per month for Master's Degree Candidates. This has created a crisis in faculty salaries, and vigorous efforts must be made to raise these salaries, if outstanding staff members are to be retained and others recruited.
>
> Dean Carson reported that of the Ohio State Engineering Alumni canvassed, 7% earned over $25,000 per year, 7.6% earned $17,000 to $24,999, 18.4% earned $11,500 to $16,999, 44.3% earned $7,500 to $11,499. The graduates of the five year program were enthusiastically in favor of the continuation of this program in the University.
>
> It was pointed out that the fine start made to rehabilitate the obsolete physical plant of the College of Engineering must be continued during the next three biennia, with a total expenditure of $12,731,000 estimated as necessary to complete the replacement and remodeling of the buildings which house the College.
>
> When Dean Carson had completed his report, Chairman Huffman expressed to him the sincere thanks of the Board for his very informative presentation.

Case Institute of Technology, Dean Carson's alma mater, gave him an honorary Doctor of Engineering degree in 1957.

Only a year later, at the faculty meeting the 13th of March, 1958, Acting Dean Bolz presided and presented Dr. Carson, "remarking that although we have lost a dean we have gained a vice-president." The new vice-president responded with remarks

> Upon the pleasure and the challenge which he had found in his experiences as dean of the College of Engineering since 1953. He stated that he sees even a greater challenge in assuming his new position, although his interest in this college continues undiminished. He remarked upon the strength of the college, the importance of the Committee of One Hundred, the importance of the building program, and the fine prospects for the continued development of the college. Finally, he expressed his gratitude to the faculty for the helpfulness and cooperation exhibited.

Unanimously, the faculty adopted this resolution:

Whereas, President Novice G. Fawcett has seen fit to recommend Dean Gordon B. Carson to the Board of Trustees for the position of Vice President - Business and Finance of the University, and

Whereas, the Trustees have approved this appointment, and

Whereas, Dean Carson has loyally served and brilliantly led the College of Engineering for five years, during which he has constantly devoted his full efforts toward improving the academic status and the physical facilities of the College and toward developing an esprit de corps of its faculty, students, and alumni,

Therefore, be it resolved that the faculty of the College of Engineering, meeting in regular session, highly approves of this appointment and takes this opportunity to salute and congratulate Gordon B. Carson, to thank him for his inspiring leadership, to wish him success, and to pledge continued support of his efforts to advance the prestige of the University.

Effective the first of October, 1958, the "acting" was removed, and Harold A. Bolz became dean of the College of Engineering. The new dean was, like Carson, a Mechanical Engineering graduate of Case Institute of Technology, having received the bachelor's degree in 1933, the master's in 1935. After experience in industry, he had become a member of the faculty at Purdue University, and when he came to Ohio State in 1954 he was head of the department of General Engineering there. Purdue awarded him an honorary doctorate in 1964.

Other changes had been made. The college had two new associate deans, Marion L. Smith of the department of Mechanical Engineering and Robert S. Green who was executive director of the Engineering Experiment Station and professor of Welding Engineering. Assistant deans were George M. Lawrence, who became secretary of the College, and Paul T. Yarrington of the department of Engineering Drawing.

At the same time, the College lost Associate Dean Lawrence D. Jones. Jones had been secretary of the University Faculty and of the University Faculty Council for/a decade, and he was transferred to the office of the president to devote all his time to University affairs. With "unanimous approval...given by a rising vote and prolonged applause," as it is recorded in the College faculty minutes, this resolution was adopted:

> WHEREAS, President Novice G. Fawcett has chosen Associate Dean Lawrence D. Jones as a member of the administrative staff of the University with the consequent loss of his direct services to the College of Engineering; and
> WHEREAS, Dean Jones has faithfully served the College of Engineering with outstanding distinction for 34 years as a member of the academic staff through the ranks from instructor to professor in the Department of Engineering Drawing, and also to Secretary, Acting Dean and Associate Dean of our College; and
> WHEREAS, during the past 13 years he has also served concurrently as secretary of the Faculty Council and Secretary of the University Faculty (which offices he still holds), contributing immeasurably to University affairs; therefore
> BE IT RESOLVED, That the Faculty of the College of Engineering, meeting in regular session, express to Dean Jones our warm and most sincere appreciation for his devoted services to the affairs of our college and wish him all success and happiness in his new assignments.

With much discussion of committee reports, including discussion in committee of the whole, the faculty finally hammered out the scheme for the two divisions of the College of Engineering. The plan was spelled out in detail in the recommendation of the University President to the Board of Trustees and adopted by the Board in meeting the 10th of July 1959. According to the minutes of this meeting:

President Fawcett presented the following:

I. GENERAL RECOMMENDATIONS

A. Recommendations from the Faculty Council:
A Proposal for the Reorganization of the College of Engineering Curricula and Their Administration

The Faculty of the College of Engineering for many months considered methods by which its curricula might be strengthened and at the same time its student failures in the upper classes reduced. As a result of these deliberations, a plan to divide all the engineering curricula (except Architecture and Landscape Architecture) into a two-year Pre-Engineering Division and a three-year Professional Division is now proposed. The Engineering Faculty feels that this will be the most significant advance in engineering education at The Ohio State University since the inauguration of the five-year curricula in 1945.

The proposal which is listed in detail below was submitted to the Council on Instruction in May 1958 and approved in principle by that body on June 19, 1958. Organizational, administrative and curricular details were approved March 6, 1959. The Faculty Council approved the proposal on May 12, 1959 and recommended the necessary changes in the Rules for the University Faculty on June 9, 1959.

The Board of Trustees is requested to implement the proposal by taking favorable action on the items listed below:

1. Reorganization

It is recommended that there be established within the College of Engineering two divisions:

a. A Pre-Engineering Division to administer the first and second years of all engineering curricula in the College and that these two years be of a pre-professional nature.

b. A Professional Division to administer the third, fourth, and fifth years of all engineering curricula in the College and that these three years be of a professional nature.

The curricula leading to the degrees, Bachelor of Architecture and Bachelor of Landscape Architecture, shall not be affected by this action.

2. Pre-Engineering Division - Admission Requirements

It is recommended that the present admission requirements be revised effective the Autumn Quarter 1961, as indicated below, and that in their amended form they constitute the admission requirements to the Pre-Engineering Division. Students admitted to the Pre-Engineering Division shall have the status of undergraduate students, regular or special.

Mathematics: The total number of units in mathematics remains unchanged. (1 unit of algebra, 1 unit of plane geometry, with the third unit to come from additional algebra, $\frac{1}{2}$ or 1 unit, or solid geometry $\frac{1}{2}$ unit or trigonometry $\frac{1}{2}$ unit.)

Science: That 1 unit of chemistry be required in addition to the 1 unit of physics now required.

3. Pre-Engineering Division - Curriculum

The curriculum of the Pre-Engineering Division, as approved by the Council on Instruction, shall include:

English, 9 credit hours
Mathematics, 28 credit hours
Engineering Drawing, 9 credit hours
Physics, 15 credit hours
Engineering Mechanics, 5 credit hours
Chemistry, 12 to 18 credit hours
Basic Education Requirements, 9 to 15 credit hours
Survey of Engineering, 2 credit hours
University Requirements in Military Science, Education, Hygiene:
men, 16 credit hours
women, 7 credit hours

4. Professional Division Admission Requirements

It is recommended that the admission procedures to the Professional Division shall be administered by the Entrance Board with the Dean of the College of Engineering appointing one or more liaison representatives to counsel with and to assist the Entrance Board at the request of the University Examiner. Students admitted to the Professional Division shall have the status of professional students, regular and special.

The minimum requirements for admission shall be effective the Autumn Quarter 1961, and will consist of a combination of:

a. Ninety quarter hours of credit in an accredited college. These credits shall be comprised of the courses , or their equivalents, listed in the Pre-Engineering Division curriculum, but not including military science, physical education, hygiene, and survey of engineering.

b. Scholastic work of satisfactory quality as evidenced by a cumulative point-hour ratio of 2.0 or higher in all the courses listed in the Pre-Engineering Division curriculum, but not including military science, physical education, hygiene, and survey of engineering.

c. Satisfactory completion of an engineering comprehensive examination. The examination will be approximately six hours in length and will cover the course work in English, mathematics, chemistry, physics, and engineering drawing scheduled in the Pre-Engineering Division curriculum. The examination will emphasize measurement of achievement, both on specific facts and the broader aspects of principles and the ability to apply knowledge to problems cutting across subject areas.

A supervisory committee of the faculty of the College of Engineering will be responsible for all aspects of the examination. The University Counseling and Testing Center will be asked to administer the examination and to provide analyses of the results and consultation services to the supervisory committee. The examination will be conducted on an experimental basis until its reliability and validity are determined to be satisfactory and until it is approved by the Board of Trustees.

d. Recommendations of the pre-engineering counselors

Special Situations

1) Admission to the Professional Division with limited deficiencies in specific courses may be allowed by the Entrance Board in cases of otherwise well-prepared students, upon the advice and consent of the Dean of the College of Engineering.

2) Students of exceptional ability may be admitted without deficiency to the Professional Division with less than 90 quarter hours of academic credit, if their ability to do advanced work is demonstrated by satisfactory completion of the engineering comprehensive examination and by an earned cumulative point-hour ratio of 3.5 or better in all completed work. Recommendations for such special admissions will be made to the Entrance Board by a Special Entrance Committee with the approval of the Dean of the College of Engineering.

3) A student not qualified for admission to the Professional Division may enroll in the Pre-Engineering Division, provided he meets the qualifications for admission to that Division. He may enroll in courses required in the Pre-Engineering Division curriculum and in required or elective courses of a Professional Division curriculum which are taught in colleges other than the College of Engineering, providing he has the prerequisites. He may not enroll in any course in any Professional Division curriculum and taught in the College of Engineering until he is admitted to the Professional Division. This provision shall not be interpreted as limiting the right of a student registered in any other colleges on this campus from enrolling in any course taught in the College of Engineering providing he has the prerequisites.

4) Admission as a "special professional student" may be granted to a candidate desiring to pursue a limited program of course work, provided the University Examiner and the Dean of the College of Engineering are satisfied that he is qualified to pursue the program.
(Note: This provision is to allow continuation of the existing practice whereby limited numbers of qualified and mature local engineers and scientists pursue special and part-time course work, not part of a degree program, without the usual admission procedures.)

5. Professional Division - Degree Requirements

It is recommended that to qualify for a baccalaureate degree, a student must:

a. Complete all the course requirements, or their equivalent, specified in the Professional Division curriculum leading to the Bachelor's degree, as well as any deficiencies with which he may have been admitted. The total required credit hours in any curriculum shall be no less than 153 credit hours nor more than 165 credit hours, not including advanced ROTC, inspection trips, summer experience, or special summer laboratories.

b. Complete the remainder of the Basic Education Requirements established by the College of Engineering which have not been satisfied while in the Pre-Engineering Division.

c. Satisfy minimum point-hour ratio requirements as established by the University Rules.

6. Objectives

The changes in organization and curricula are proposed by the Faculty of the College of Engineering, with the expectation of attaining the following objectives:

a. To define a common first two years of pre-engineering work which may be taken at accredited liberal arts colleges, junior colleges, community colleges, The Ohio State University branches or in the Pre-Engineering Division of the College of Engineering.

b. To provide a two-year preparatory period wherein students may evaluate their abilities with guidance and reflect more fully upon their choice of a career. Students registered in the Pre-Engineering Division who show questionable interest or academic ability in engineering could terminate their studies, or transfer to another educational program, with some pride of accomplishment rather than continuing failure in the upper classes. Qualified students who start in programs outside the College of Engineering and who choose appropriate courses could enter the Professional Division in engineering with full standing.

c. To strengthen the College of Engineering in its role as the center of advanced engineering education and research in the State of Ohio.

d. To improve the professional character of the engineering curriculum. Since all states now have laws defining a professional engineer and providing for the licensing of professional engineers, the faculty of the College of Engineering feels it is timely that the engineering curriculum reflect this growing trend toward professional status.

e. To provide through an engineering comprehensive examination:

1) Better motivation for retention and integration of knowledge in the course work taken in the Pre-Engineering curriculum.

2) Reasonable assurance of success in the Professional Division program for those who pass the examination, thereby greatly reducing the incidence of failure in the Professional Division of the College.
(During the past five years these failures in the third, fourth, and fifth years have averaged 15%.)

Machinery to implement the two-division plan had to be devised. The engineering comprehensive examination (ECE) was permitted on an experimental basis until its validity could be ascertained, and arrangements were made to hold the first test the 30th of September 1960. The first examination was taken by 312. Quarter by quarter the examination was improved, giving those who craved admission to the Professional Division an opportunity to demonstrate ability in Mathematics, Physics, Chemistry, Engineering Drawing, and English.

Since the E C E was not a criterion for admission to the Professional Division, however, it came under some criticism. A committee reported that its indications of success in completing the course were only slightly more significant than the Pre-Professional point-hour (PPHR) ratio figures. Accordingly, in the meeting of April 1965 its use was "suspended."

Recognition of the extra effort of students who undertook to obtain both the bachelor's and master's degrees in the five-year program was proposed by the Graduate Advisory Committee on Engineering, suggesting the name "two-degree merit program." The faculty decided, in meeting the 12th of November 1959, to retain the name "Combined Bachelor's and Master's Degree Program."

Various proposals and changes, all in the interest of keeping abreast of developments and improving engineering education and administration of programs and facilities, were considered by the College of Engineering faculty. In January 1956 a committee report on servomechanism and instrumentation was adopted, making the introduction of necessary material on these subjects the responsibility of the various departments. The committee stated:

> It is hard to reconcile the need for the broadening of technical education requirements with the increasing depth of knowledge in many areas of specialization. This integration of material from several fields would be particularly difficult within the confines of the traditional undergraduate program. The committee believes that the major effort toward integration should be undertaken at the post-graduate level...

Agitation for "applied mathematics," relating the subject to the physical or tangible situations confronting the student, continued. In meeting the 13th of October 1960, the faculty heard a majority report of the committee on mathematics recommend that the work should be kept in the department of Mathematics and improvements should be worked out. A minority report recommended moving instruction in applied mathematics to the College of Engineering where, it was averred, teaching might be better and the lot of the teacher improved. In a subsequent meeting the dean of the College of Arts and Sciences, himself a scientist, indicated that since the associate dean, responsible for the work in Mathematics and the sciences, was a physicist, the needs of the engineering students would get attention. The teaching staff was increased, and by May 1964 the teaching of mathematics to the engineers was reported as better than ever.

University planning for the location of departments suggested that the departments of Photography and Mineralogy and the School of Architecture and Landscape Architecture should be taken out of the College of Engineering. This "raid" was averted. In faculty meetings the November and December 1962, the departments expressed a desire to stay where they were. The director of the School of Architecture and Landscape Architecture declared that he would prefer the school to be independent, as was the case at many institutions, but until independence was assured, he preferred the College of Engineering.

Considering possibilities for year-round utilization of the University facilities, which might enable the ambitious student to take an accelerated program and get through more quickly, the faculty plumped for continuation of the Quarter System over the trimester or other plans:

> The quarter plan provides more flexibility, broader faculty contacts and evaluation of students, and is better adapted to an academic year operation, full year operation, or a

> combination thereof, than the trimester plan. The trimester plan seems to offer only one advantage and that is the one of fewer starts and stops...

Faculty as well as students got the opportunity to learn something of the programming of computers in seminar classes at the Computation Center in the late fifties. Gradually, first as a course in the department of Mechanics, instruction in computer work was introduced. The Division of Computer and Information Sciences was established/located administratively in July 1967 in the College of Engineering//in November as a combination of two divisions which had been established the previous year. In April 1968 this division was changed to the Department of Computer and Information Science. Its facilities provide the full range of academic programs from the baccalaureate to the doctorate.

Changes of names of departments received approval as conditions seemed to warrant. In February 1963 the School of Aviation became the department of Aviation. In November 1966 the department of Engineering Drawing became the department of Engineering Graphics. In November 1959 the faculty agreed to change the designation of the department of Aeronautical Engineering (and the corresponding bachelor's degree) to Aero-Space; that change was denied by the University administration, and in the spring of 1960 department and degree became Aeronautical and Astronautical Engineering. In the spring of 1968 the department of Photography was changed to department of Photography and Cinema.

With the three teaching disciplines of Architecture, Landscape Architecture, and City and Regional Planning giving it greater breadth, the School of Architecture and Landscape Architecture was renamed, in May 1966, the School of Architecture. Its three divisions correspond to the teaching specialiies.

In February 1963 the administrative responsibility of the teaching reactor devolved upon the College of Engineering. The faculty, at the meeting the 2nd of March 1967 was informed that the Transportation Research Center, planned for East Liberty, about 50 miles from Columbus, would afford facilities for extensive graduate programs and important cooperation with industry. This facility is administratively a part of the Engineering Experiment Station.

Administrative and educational responsibilities extend much farther afield. In 1961 The Ohio State University became involved, with a number of other universities, in planning and developing an institute of technology at Kanpur, India. A number of members of the College of Engineering faculty have spent up to a maximum of two years at this institution. Associate Dean Robert S. Green was at Kanpur 1964-1966. The Kanpur Institute of Technology held its first commencement the 29th of October 1965, and Dean Bolz attended, representing the steering committee of the universities involved and the United States Department of State.

Two former secretaries of the College died in the early sixties, and were suitably memorialized. Lawrence D. Jones passed away the 27th of October, 1961; in his memory, the Trustees named one of the dormitories the Jones Graduate Tower. Prof. Robert Meiklejohn of Engineering Drawing died the 20th of January 1964.

Scholarship, attempts to attract qualified students, and service to the public--including the industries and organizations requiring the services of well educated engineers--were continuingmatters of faculty attention during the fifties and sixties. At various faculty meetings the availability of scholarships for engineering students was discussed; during 1959-60 about 13 per cent of the students in the College held scholarships of some sort. In 1965, with support from the Ford Foundation, a master's degree program was begun to attract students, both graduates and undergraduates, to the solution of problems specifically related to the metals industry. In the spring of 1963

the College of Engineering became the coordinating center for the JETS--the members of the Junior Engineering Technical Society--in Ohio. That same year the faculty recognized Delphi, an organization of upperclassmen and graduate students to provide guidance to younger engineering students.

Professional degrees, promoted since 1950 by degree-granting departments that were interested in enabling outstanding graduates to qualify on the basis of their engineering accomplishments since receiving the bachelor's degree, were discontinued in the spring of 1963. It was pointed out that professional registration had somewhat diminished the value of this additional academic recognition./ Only a few professional degrees, of the style of Civil Engineer, had been granted since the initiative was removed from the candidate and transferred to the departments; some departments had practically ignored the possibilities. The faculty voted to abolish these degrees, effective the first of July 1963. Also, the "distinguished alumnus" designation, recognized some graduates.

Discussion continued, in faculty deliberations and in the University administration, as to the wisdom of putting all entering students into a "General" College, where, in programs designed to bring out special abilities and aptitudes, decisions could be made, after a year or two of preliminrry study, as to what professional courses the students should undertake. The Board of Trustees voted to establish the General College, effective the first of July 1966. For preparation, they appointed the dean of the University College in the fall of 1965. The new dean selected for this work was Richard H. Zimmerman, a professor of Mechanical Engineering, who had had a tour of duty at the Kanpur Institute of Technology, in India.

Though all students entering the University were to be together for the first year--or perhaps two years--where, hopefully, those who lacked engineering aptitude could be steered into other fields, and, perhaps, some who had not considered engineering but possessed special qualifications for it might be captured, the College of Engineering was interested in making suggestions about high school preparation of those with a bent for technology and about preliminary courses in the University College. That sentiment had been voiced in faculty meeting in the spring of 1958. Reporting on required programs, the College Committee on Engineering Instruction stated that the University Faculty Council had cautioned:

> Before making a radical change in the structures of our five basic colleges, a final attempt should be made to preserve college autonomy in our planning, subject to the recognition and effective enforcement of requirements enacted by the University Faculty.

Such autonomy appears to have been assured in the program of the University College. OPerating at first only in the branches of the Ohio State University, while the plans were developed, the University College became the entering portal for all new first-year students of the University in the summer quarter 1969. About 700 freshmen were enrolled that summer quarter,of whom 47 intended to qualify for transfer to the College of Engineering.

In October 1967, the Committee on Engineering Instruction had reported to the College of Engineering faculty that "we are assured that our first year can be prescribed."

Spring 1967 was a momentous time for the College of Engineering. ACE Day festivities included the dedication of a number of new buildings of the College--Hitchcock Hall, into which the College office, including the placement service had moved in March; Watts Hall, new home of Ceramic Engineering; the Metallurgical Engineering Building; the Aeronautical and Astronautical Research Laboratory; and

the Boyd, McCaughey, and MacQuigg laboratories. The Placement Office had reported "another year of high demand and short supply for engineers," and that the offerings of "salaries continued to escalate." The faculty, in meeting the 2nd of March, discussed preliminary planning for the College activities in connection with the University's Centennial Year, 1970. The first century of achievement of students and faculty would be displayed, and there would be a long look ahead into the prospects of engineering during the next hundred years.

Meanwhile, steps had to be taken toward preparing the College curricula for the changes that would be made when the University College got into full operation. At the meeting the 27th of May, 1967, the faculty of the College of Engineering directed the Committee on Engineering Instruction and the various departments "to proceed cooperatively with the detailed development of four-year bachelor's degree programs and fifth-year graduate and professional programs in engineering."

This action followed the recommendation of the Committee on Engineering Instruction

> That Ohio State modify its existing five-year curriculum by awarding a bachelor's degree at the completion of a four-year program and by providing two fifth-year programs, one leading to a master of science degree and the other to an advanced [illegible] professional degree...

With the first year of the Pre-Engineering Division swallowed up by the University College, and entrance into the College of Engineering dependent on satisfactory performance of certain prescribed programs during that first year, continuation of the lower division of the College of Engineering obviously made little sense. Moreover, though the College had successfully coped with the difficulties of the combined program, including adding an extra quarter or two

whenever necessary, there had been no corresponding adoption of five-year programs by other representative colleges of engineering. Dean Bolz had reported to the faculty in the spring of 1960 that salary offerings to graduates of the five-year course appeared to be about $25 more per month than to graduates of four-year programs in universities similar to Ohio State. The placement director's report for 1966 stated that Ohio State was one of three colleges of engineering still having a five-year program.

Another significant statement in the 1966 report of the placement director was that though "employer demands ran far in excess of the numbers available," a condition not confined to Ohio State but a "national situation that baffles educators as well as employers," it was "surprising to find fewer students choosing engineering."

An increasing number of graduates with bachelor's degrees were entering Graduate School instead of going into industry. The reports of the placement director had begun to mention this situation, as well as employment prospects of those who received engineering master's and doctor's degrees. Only 296 bachelor's degrees were awarded in 1964, and 79 of that class planned to take graduate work. The 1965 crop included 312 with degrees as bachelors, 181 with master's, and 78 with doctorates in engineering.

Apparently, the Committee on Instruction had sensed the need for a program of engineering education that would permit the student to decide, after taking a four-year basic course, whether to choose one of three paths: go into engineering employment, take an additional year in a specialized field of engineering, or enroll in a program of graduate study leading to the degrees of Master of Science and Doctor of Philosophy.

Rather a large mouthful was offered by the Committee on Engineering Instruction to the faculty meeting the 22nd of January 1968:

> The College of Engineering shall discontinue the present-five-year program in engineering and adopt the following programs:
>
> A. Four-year programs leading to baccauaureate degrees in engineering to become effective for engineering freshmen who enter the University the Summer quarter 1969 and thereafter...
>
> B. Advanced professional programs, administered by the College of Engineering, requiring approximately 45 quarter hours beyond the level of achievement represented by the Ohio State Univeristy bachelor's program in that area.... The advanced professional program should emphasize design, analysis, and engineering applications and be closely related to engineering practice through experience with current engineering problems....
>
> C. Continued graduate programs administered by the Graduate School leading to the Master of Science and Doctor of Philosophy.

Discussion of these proposals continued in adjourned meetings, the 27th of January and the third of February. The "approximately 45 quarter hours" for the advanced professional program was changed in discussion to "a minimum of 45 quarter hours of study." The proposals were adopted. Dean Bolz summarized the situation:

> On Monday, January 22, this faculty arrived at a major and perhaps historic decision in moving from a five-year to a four-year program for the bachelor's degree...
>
> It has been believed for many years by this faculty that more than four years are needed to prepare engineers for the real leadership roles in the profession. There is now national recognition of this need and this is expressed in the report of the A.S.E.E. study of the Goals of Engineering Education recommending increased attention to graduate professional instruction.
>
> This means that our faculty now faces the challenge of designing fifth-year post-baccalaureate programs that will serve not only those students who are interested in research and teaching but also those planning careers in the sophisticated phases of design, production, operation, and management. In seeking to meet this challenge we now have the opportunity to take advan-

> of the rather wide diversity in size and interests that is to be found among our departments. Varied fifth-year post-baccalaureate programs will allow the faculty to explore new educational patterns and will also serve to attract more students with varied interests and goals. Variety and experimentation by individual departments in the graduate-professional area should help us to find the best path to new excellence....

As finally approved, the advanced professional program was made open not only to graduates of the various degree-granting departments of the College of Engineering at Ohio State but also to holders of bachelor's degrees in engineering from other E.C.P.D./accredited schools. In addition, graduates of "regionally accredited schools or equivalent foreign institutions who have majored in engineering or in fields related to engineering (mathematics, physics, etc.)" may enter as special students, their status in becoming candidates for the advanced professional degree to be determined if they "gain essentially the same level of achievement as that expected of Ohio State engineering graduates."

What to call the new degrees required much additional discussion. It was decided that the graduate of one of the four-year programs would be a Bachelor of Science in Civil Engineering, for example. The committee appointed to recommend a designation for the advanced professional degree was ordered not to include either the "master" or the "doctor" in the list. Offerings set forth in the catalogues of 70 universities offiring engineering degrees were considered. The decision, made in faculty meeting the 10th of May 1968, was that the degree to be awarded for successfully completing the advanced professional program would be in the style of Civil Engineer, Electrical Engineer, and so forth.

Adoption of the two new programs--the four-year basic course and the fifth year of advanced professional study--required not only development of new curricula but also solving the problem of transition.

Students who had entered the College earlier than the summer quarter 1969 would be given the option of continuing with the original program in which they had enrolled, the five-year course leading to the Bachelor of Civil Engineering (to use an example) degree, or adjusting their courses to the new curricula in order to obtain (for example) the Bachelor of Science in Civil Engineering for successful completion of four year's work. The style of degree used in the five-year bachelor's programs, for example Bachelor of Ceramic Engineering, will be discontinued after the Commencement in June 1974.

Gung-ho students in the University College who have set their educational sights on engineering will not be isolated from the technically-flavored environment of the College of Engineering. They will be exposed to the lectures of Engineering College professors in a quarter of the course "Survey of Engineering." The University College has arranged conditions for their transfer to the College of Engineering on the basis of four criteria:

(a) having completed suceessfully Math 152
(b) having completed successfully Physics 132 or Chemistry 122
(c) having completed 48 credit hours
(d) having a point-hour ratio which satisfies the University requirements on minimum academic standards.

Estimates of the University College administration are that 75 to 80 per cent of the first-quarter freshmen in the Central Campus college who plan to study engineering should qualify for transfer to the College of Engineering on completion of their first three quarters full time at the University. The percentage of those who may qualify to enter engineering after three quarters' study at the Ohio State University branch campuses is 60 to 70.

Approval of the new programs and degrees in engineering is set forth in the minutes of the November 14, 1968 meeting of the University Trustees:

Proposal for Revision of Curricula Leading to Eleven New Baccalaureate Degrees in the College of Engineering and Two New Professional Degrees

The Faculty Council on October 8, 1968, upon the recommendation of the Council on Academic Affairs, approved for transmittal to the Board of Trustees the request for a major revision of the curricula in the College of Engineering. This request included changing (1) to a four-year curriculum, (2) name of the degree to be granted and (3) an advanced professional degree program.

The reorganized programs place greater emphasis on, and offer more opportunity for, post-baccalaureate study for those engineering students preparing for professional practice in engineering. These changes will provide greater flexibility in the years ahead for students who want to strengthen their preparation for careers in the new and more sophisticated areas of professional practice. The new programs in engineering will afford opportunities for students who plan careers in design, development and other areas of engineering practice to obtain advanced professional education comparable to that which has been available traditionally for those students who are oriented more toward research and teaching. They will also give the college basic programs in engineering which are consistent with well-established trends in engineering education and with recommendations of the recently completed GOALS Study of Engineering Education.

The adoption of eleven new baccalaureate degrees to be awarded upon completion of the four-year prescribed programs in the College of Engineering as they are changed will be:

From five-year curricula leading to	To four-year curricula leading to
Bachelor of Aeronautical and Astronautical Engineering	Bachelor of Science in Aeronautical and Astronautical Engineering
Bachelor of Agricultural Engineering	Bachelor of Science in Agricultural Engineering
Bachelor of Ceramic Engineering	Bachelor of Science in Ceramic Engineering
Bachelor of Chemical Engineering	Bachelor of Science in Chemical Engineering
Bachelor of Civil Engineering	Bachelor of Science in Civil Engineering
Bachelor of Electrical Engineering	Bachelor of Science in Electrical Engineering
Bachelor of Industrial Engineering	Bachelor of Science in Industrial Engineering
Bachelor of Mechanical Engineering	Bachelor of Science in Mechanical Engineering
Bachelor of Metallurgical Engineering	Bachelor of Science in Metallurgical Engineering
Bachelor of Science in Physics	Bachelor of Science in Engineering Physics
Bachelor of Welding Engineering	Bachelor of Science in Welding Engineering

The present five-year degree will be available through June Commencement, 1974, and will be phased out with the introduction of the new four-year degree.

An advanced professional degree program leading either to the degree * Electrical Engineer or Mechanical Engineer and administered by the College of Engineering will be inaugurated. These programs will consist of a one-year sequence of requirements (minimum of 45 hours) beyond the level of achievement represented by The Ohio State University bachelor's program.

The post-baccalaureate study will continue the existing Master of Science program administered through the Graduate School in addition to establishing the new advanced professional program administered through the College of Engineering.

President Fawcett recommended that the above proposal for revising the curricula and the names of the degrees in the College of Engineering and the establishment of two new professional degrees as recommended by the Faculty Council be approved. It was recommended further that the said new programs and degrees become effective immediately.

*Faculty approval of a similar program leading to the degree Industrial Engineer was given at the College of Engineering meeting April 23, 1969.

In the penultimate year of its first century, the College of Engineering has/been engaged, as at all other times in its history, in continuing to offer professional education of high quality to fit its students for successful careers of service. It has graduated about sixteen thousand persons who, as once expressed by one of its alumni, the late Professor C. E. Sherman (C.E. 1894) who for many years was chairman of the department of Civil Engineering, were fitted to be "engineers and useful citizens."

Professor Sherman gave the commencement address at the March, 1929, convocation of The Ohio State University. Its title (with particular reference to engineers, the members of a profession/with which he was most familiar) was "Mechanics with Vision." In it he gave this optimistic comment on the outlook for college graduates, particularly engineers:

> You are greatly desired in the world. The outside world thinks well of you. I have figures on this, at least for one college. In Engineering we cannot supply the demand for graduates in spite of their increased numbers...

After forty years (though with the knowledge explosion some might quibble a bit over Sherman's reference to "mechanics") the world still greatly desires and needs engineers and their work. The 1969 report of the Placement Office of the College of Engineering states that the "Year ended on a note of growth and prosperity for engineers." Salaries being offered had increased, and "employment opportunities were still well ahead of the supply." Of the 403 bachelors (361 in the engineering curricula and 42 from the School of Architecture) 61 per cent were married. Thirty-seven were continuing their education in the Graduate School. The extent of graduate work in engineering was impressive; in addition to the bachelors, the class of 1969 included 234 who had taken the

master's degree, and 100 who had received the Ph.D. degree in advanced courses of the College of Engineering. (Work of the master's and doctor's degrees, of course, had been administered by the Graduate School of the University.) There is every indication that future reports of the Placement Office will contain equally glowing information on the prospects of the holders of the engineering bachelor's, master's, and doctor's degrees, and also of the new professional degrees.

In the Centennial Year of the Ohio State University, the College of Engineering will celebrate the achievements of its graduates. There will be recognition of distinguished alumni, commemoration of devoted faculty members, and presentation of novel programs in education and research. The College will look back with pride on its first century, and look ahead with confidence to its role in the University and the world during the second century of The Ohio State University.

APPENDIX I

DEDICATION OF NEW COLLEGE OF ENGINEERING BUILDINGS

Friday, May 12, 1967

Hitchcock Hall
2070 Neil Avenue

NAMED IN HONOR OF EMBURY ASBURY HITCHCOCK

Administrative Offices for:

College of Engineering

Engineering Experiment Station

Transportation Research Center

750-Seat Auditorium

Classrooms, laboratories, offices for:

Department of Civil Engineering

Department of Engineering Graphics

Completed: 1967 — Cost: $2,600,000

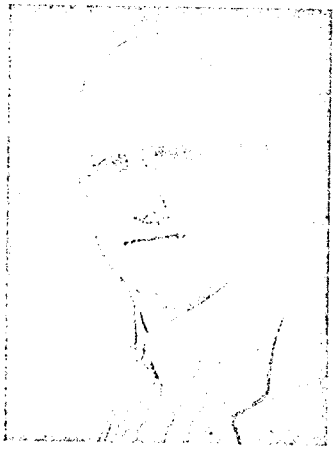
Source of Financial Support: State Bond Issue for Capital Improvements

115,375 Square Feet of Floor Space

Architects: Schooley, Cornelius, & Schooley

Structural Engineers: Fling & Eeman

Contractors: Knowlton Construction Co. — General; Huffman-Wolfe Co. — Heating, Ventilating, Plumbing; Electric Power Equipment Co. — Electrical.



EMBURY ASBURY HITCHCOCK

1866 - 1948

EMBURY A. Hitchcock was persuaded to return to The Ohio State University in 1920 to become Dean of the College of Engineering and Director of the Engineering Experiment Station. He had resigned his position as professor of mechanical engineering seven years earlier. That resignation had interrupted a career at Ohio State that began in January 1893, when he was appointed as an assistant in experimental engineering to Professor Stillman W. Robinson, founder of the University's Department of Mechanical Engineering. Embury Hitchcock, M.E., a native of New York State, graduated from Sibley College at Cornell in the class of 1890. Before coming to Ohio State he spent two years as a designer with the Corliss Engine Company of Providence, Rhode Island. His unique qualities as a teacher were recognized quickly and he advanced steadily in the teaching ranks to become a full professor in 1901. In his twenty years as a teacher he led his students in much experimental work, including the first complete heat-balance tests on railroad locomotives in service. After resigning, Mr. Hitchcock worked in industry — first in the management of utility properties, including hydroelectric installations in the Tennessee Valley. In 1919 he became vice president of the Bailey Meter Company of Cleveland — a company founded by Mr. Ervin G. Bailey, BME 1903, who as a student had done experimental work under Professor Hitchcock's direction. When the College of Engineering was looking for a dean, and a member of the faculty exclaimed — "We'd better have someone who knows us" — the President and the Board of Trustees challenged Hitchcock to return to the campus for the position. He served as dean of the college for sixteen years, retiring in 1936. After retirement, Dean Hitchcock completed his autobiography, *My 50 Years in Engineering*, wrote the history of the Columbus Engineers' Club on the occasion of its golden anniversary in 1938, and compiled a history of the Department of Mechanical Engineering at The Ohio State University. For several years, both before and after retirement, he served as one of the judges of the Fisher Body Craftsman's Guild. One of Dean Hitchcock's most distinctive characteristics was his sympathetic rapport with students. He had a kindly attitude that spurred the young men to do their best. The students responded; "They just raise the roof" was a faculty member's description of the scene when Hitchcock was introduced to speak. He instituted the weekly Survey of Engineering lectures and encouraged engineering student activities. The effect of this sympathetic attitude, as expressed by a student who later became a faculty member, was — "When you talk with Dean Hitchcock, you know he has your interest at heart."

Boyd Laboratory
155 West Woodruff Avenue

NAMED IN HONOR OF JAMES ELLSWORTH BOYD

Laboratories, classrooms, and offices for:

Department of Engineering Mechanics

Completed 1965 — Cost $380,000

Source of Financial Support: State Bond Issue for Capital Improvements

22,756 Square Feet of Floor Space

Achieved through major remodeling of the former State Highway Testing Laboratories

Architect: Dan A. Carmichael

Contractors: C. C. Vogel — General; Limbach Co. — Heating and Ventilating; Piping Contractors, Inc. — Plumbing; Blum and Son Electric Co. — Electrical.

MacQuigg Laboratory
105 West Woodruff Avenue

NAMED IN HONOR OF CHARLES ELLISON MacQUIGG

Department of Ceramic Engineering

Department of Metallurgical Engineering

Department of Mineralogy

Refractories Industry Research Center

Completed 1967 — Cost $2,300,000

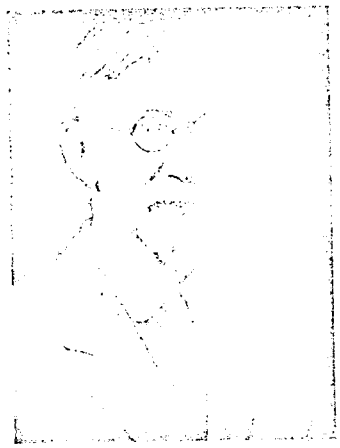
Source of Financial Support: State Bond Issue for Capital Improvements

57,021 Square Feet of Floor Space

Architects: Office of University Architect

Structural Engineers: Fling & Eeman

Contractors: James I. Barnes Construction Co. — General; Kuempel Co. — Heating and Ventilating; Tibbett Plumbing & Heating Co. — Plumbing; McCarty Bros. Electric Co. — Electrical.



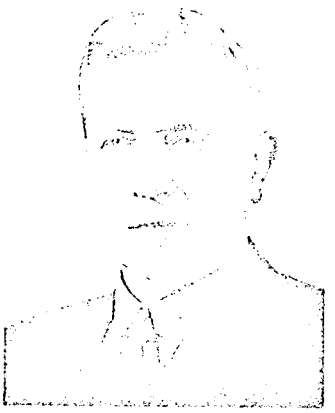
JAMES ELLSWORTH BOYD

1863 - 1950

WHEN A teacher becomes a legend in his lifetime, he has made a deep impression on his students. The impression that James E. Boyd made was one of mingled affection and respect. Affection showed in the way his students spoke of him; they discussed him as "Jimmie Boyd." That was among themselves, never in addressing him. With his pointed goatee and powerful voice, he was a figure of authority. The students told stories about him — how he insisted that you sit erect in class, feet on the floor, how he demanded that you know the multiplication table thoroughly, at least through the 15's; how he detested slide rule answers, with their danger of ridiculous results from a misplaced decimal point, such as a computation that a piece of wood 40 inches long, 1½ inches wide, and a quarter inch thick could support several tons suspended from its center, followed by the barked question, "Could you load a meter stick that way?" Behind that booming voice and authoritative manner was humanitarianism. Students knew that Professor Boyd, despite his gruff exterior, was a kindly man who might adjust a grade upward if a student proved he had a good solution for a misunderstood question. Faculty members knew the modest and sympathetic man behind the rigorous educator and vigorous battler for principles and practices he thought were right. His modesty showed in his sense of values; he asked that he not be considered for an honorary degree after he had been awarded the Lamme Medal which he had received in 1938 in recognition of his eminence as an engineer and engineering educator. Jimmie Boyd, product of a self-sufficient Muskingum County farm, became entranced with the possibilities of science, both pure and applied, by his father's report of the mechanical marvels at the Ohio State Fair. He lacked college entrance credits, and the preparatory department at Ohio State was full, so he prepared — alternating studies with periods of teaching country school — at Ohio Wesleyan. There he developed a consuming interest in physics. He entered Ohio State in 1887 and was graduated in 1891. He immediately began teaching in the Department of Physics, with particular emphasis on electricity. His honeymoon, in 1893, to visit the World's Columbian Exposition in Chicago, lasted all summer because he got a job demonstrating the Fair's electrical gadgetry. He taught at Ohio State 45 years, except for a year's leave of absence 1895-96, to get a Master's at Cornell. Professor Boyd was versatile. He moved from teaching physics to teaching mathematics, and then to mechanics — the application of mathematics to materials. He headed the Department of Mechanics 28 years, from its establishment in 1906 to 1934, and continued to teach there until his retirement in 1936. His authoritative textbook, *Strength of Materials*, appeared in 1911, his *Mechanics* in 1921. He was acting dean of the College of Engineering 1909-10. During the first world war he worked with the National Bureau of Standards on computations and empirical determinations of the strength of tapered struts, information that was vital for our military aviation. Much of his work of half a century ago is still valid in today's airplane industry.

CHARLES ELLISON MacQUIGG

1885 - 1952



CHARLES E. MacQuigg became dean of the College of Engineering and director of the Engineering Experiment Station at The Ohio State University in 1937. He had been industrial development manager of Union Carbide and Carbon Research Laboratories in New York, a job that required such diverse duties as presenting papers before technical societies and wading in the Long Island tidal marshes to observe the corrosion of metallic plates alternately exposed to air and salt water. The new dean was a native of Ironton (appropriate name for a metallurgist's birthplace), graduate of The Ohio State University in the class of '09 with the degree engineer of mines, and one of the founders of the Ohio State University Research Foundation. His prior professional and academic experience included Santa Fe Railroad location and construction in Texas, engineering testing with the Anaconda Copper Company in Montana, and five years as head of the Department of Metallurgy at the Pennsylvania State College. He served in the first world war as a captain of Ordnance, and later advanced to lieutenant colonel in the Reserve. Just before taking up his duties, Dean Elect and Mrs. MacQuigg were in Europe for him to observe engineering education over there and to deliver a paper, "The Effect of Temperature on Metals," at the London meeting of the International Association for Testing Materials. He belonged to many scientific and professional organizations. He believed that technical education and research complement each other. He was an advocate of education in breadth; under his leadership, the College of Engineering at Ohio State increased the broadening content of its curriculum. He was always studying; in the hospital shortly before his death he was reading a book on mathematics. He was enthusiastic about his work and responsibility for technical education and scientific research. In 1947-48 he served as president of the American Society for Engineering Education. He took a prominent part in public service, including the direction of defense training programs and participation on boards and commissions, particularly for the conservation of water resources. Clarkson College of Technology "doctored" him (his word) in 1946. In 1948 he received the Armed Forces Certificate of Appreciation. In his associations with faculty and students, Dean MacQuigg was always a friend and wise counselor. A student memorial deploring his untimely death expressed appreciation for his friendliness: "Dean MacQuigg was more to the students than Dean of the College of Engineering. He was like a father to all engineering students. His office was equally accessible to the students and faculty members . . . His modesty and genuine liking for people left us as students with lasting impression. This, coupled with his inevitable injections of wit at the proper time, was responsible for alleviating the seriousness of a student's personal or educational problems. Charles Ellison MacQuigg will be remembered by his students as a personal friend as well as a great educator."

McCaughey Laboratory
104 West 19th Avenue

NAMED IN HONOR OF WILLIAM JOHN McCAUGHEY

Laboratories, classrooms, and offices for:

Department of Mineralogy

Completed 1967 — Cost: Included in cost of MacQuigg Laboratory

Source of Financial Support: State Bond Issue for Capital Improvements

18,525 Square Feet of Floor Space
A designated area in Watts Hall and MacQuigg Laboratory reserved for mineralogical studies

Architects: Office of University Architect

Contractors: James I. Barnes Construction Co. — General; Kuempel Co. — Heating and Ventilating; Tibbett Plumbing & Heating Co. — Plumbing; McCarty Bros. Electric Co. — Electrical.

Watts Hall
2041 North College Road

NAMED IN HONOR OF ARTHUR SIMEON WATTS

Laboratories, classrooms, and offices for:

Department of Ceramic Engineering

Department of Metallurgical Engineering

Materials Engineering Library

Complete 1966 — Cost: Included in MacQuigg Laboratory contract

Source of Financial Support: State Bond Issue for Capital Improvements

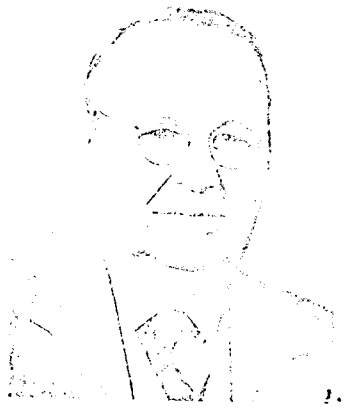
32,500 Square Feet of Floor Space
Achieved through purchase and minor remodeling of the former Chemical Abstracts Building

Architects: Office of University Architect

Contractors: James I. Barnes Construction Co. — General; Kuempel Co. — Heating and Ventilating; Tibbett Plumbing & Heating Co. — Plumbing; McCarty Bros. Electric Co. — Electrical.

WILLIAM JOHN McCAUGHEY

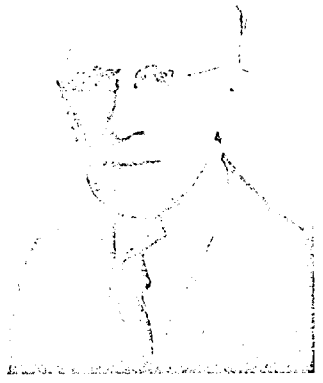
1882 - 1962



HIS JOLLY, round face animated, his voice trailing off at times into a breathless falsetto, Professor W. J. McCaughey would sit in front of his cluttered desk leaning across an equally cluttered table, and preach the beauties of mineralogy to one or several students or graduates who might be sitting in his small office in Lord Hall. He was equally evangelical before a class or addressing a large audience. His enthusiasm made mineralogy about the most exciting subject in the curriculum, whether he was expounding theory such as the behavior of silicates at high temperatures or shedding light on such practical problems as the behavior of slag in a blast furnace. He was a doctor of philosophy who talked with and learned from shop foremen. "How do they know the melt is ready to pour?" he would shout. "Because, as a shift boss told me, they can tell it's done from the looks of the slag." McCaughey's practical approach to solving production problems in turning earthy materials to use, particularly in metallurgy and ceramics, was based on sound scientific fundamentals. A Philadelphian, he was graduated a bachelor of science in chemistry by the University of Pennsylvania in 1906. Then he worked for the government as assistant assayer for the U. S. Mint from 1906 to 1908, as mineralogist for the U. S. Bureau of Soils from 1908 to 1911. He studied while he worked — at Johns Hopkins and George Washington Universities. George Washington granted him the Ph.D. in 1912. In 1911 Mr. McCaughey began his teaching career at The Ohio State University, as assistant professor of metallurgy and mineralogy. He was made acting head of the Department of Mineralogy in 1913, professor and chairman in 1916. He retired from teaching in 1952. In 1953 Ohio State conferred an honorary D.Sc. on him, and in 1960 a graduate fellowship in mineralogy was established in his honor. Dr. McCaughey belonged to and participated actively in numerous scientific societies in his professional specialty and related fields. He was known internationally for work in microscopic mineralogy, in thermochemical mineralogy, and in the behavior of complex silicate systems at high temperatures. Because of his contributions to ceramic science, he was chosen to give the American Ceramic Society Edward Orton, Jr. Memorial Lecture in 1936, and received the Bleininger Medal from the Pittsburgh Section of American Ceramic Society in 1954. In his professional work, Dr. McCaughey combined the most rigorous scientific accuracy with the most practical approach to everyday production problems. In effect, he could touch the earth and the clouds at the same time. He is most vividly remembered by his colleagues, his students, and professional associates for his friendliness and enthusiasm.

ARTHUR SIMEON WATTS

1876 - 1962



LITERALLY AND figuratively, the professional work of Arthur S. Watts was down to earth. He grew up in Zanesville, Ohio, a center of pottery and heavy clay products manufacturing. He entered The Ohio State University in 1896 to study mining, but switched in 1897 to the short course in ceramic engineering; he quit school in 1898 to work for a telephone company; he returned to college in 1900 as assistant to Professor Edward Orton, Jr., founder of ceramic education, and in 1901 received a certificate for completing the short course. Along with Professor Orton, he was a maker of the science of ceramics. Watts made a great deal of ceramic science on the job. After receiving his certificate, he spent eight years in industry, developing and manufacturing electrical porcelain insulation to control the rapidly growing giant — electricity. Between 1909 and 1911 he studied in Germany. Then he was quarry technologist with the United States Bureau of Mines and consultant with the Westinghouse Company. His teaching career began in 1914 when he was appointed associate professor of ceramic engineering. From 1915 until his retirement in 1946 he was chairman of the Department of Ceramic Engineering, and his teaching included passing on the performance of candidates for advanced degrees before he himself received appropriate academic recognition — the professional degree, Ceramic Engineer, in 1928. In 1950, Alfred University — the New York College of Ceramics — made him an honorary Doctor of Science; Ohio State granted him the honorary D.Sc. in 1951. Professor Watts was in every sort of activity in ceramics — professional, research, educational and industrial. He was president of the American Ceramic Society in 1912. He was a charter Fellow of the American Ceramic Society, dean of Fellows 1936-37, became a life member in 1946. He was founder of the National Institue of Ceramic Engineers. He served as trustee of the Edward Orton, Jr. Ceramic Foundation. He belonged to Keramos, the ceramic engineering honorary, Tau Beta Pi and Alpha Chi Sigma. Along with his teaching, Professor Watts was active as inventor, developer, and writer in the field of ceramics. He exulted that 40 of the 160 papers on the 1940 program of the American Ceramic Society were by men who had been educated in his department. He himself wrote more than a hundred technical papers on such diverse subjects as eutectic based glazes, dental and electrical porcelain, wet grinding, and preheating of combustion air. He also wrote a popular circular, "The Selection of Dinnerware for the Home," and held American and foreign patents on ceramic processes. Until shortly before his death he was active in technical studies on sparkplugs. Notable as his personal achievements were, Professor Watts' most outstanding contribution was the ceramic engineers who had been educated under his direction. They recognized their debt. In 1945, alumni of the ceramic engineering classes of 1914-1945, inclusive, established the Arthur S. Watts Scholarship to honor the long and meritorious service of Professor Watts and to express their appreciation of the interest and counsel he had extended during both their college and professional careers.

Metallurgical Engineering Building

116 West 19th Avenue

Laboratories, classrooms, and offices for:

Department of Metallurgical Engineering

Corrosion Research Center

Department of Mineralogy

Completed 1964 -- Cost $850,000

Source of Financial Support:

General Revenue Funds, State of Ohio	$400,000
National Science Foundation	250,000
University Treasurer's Account	200,000

32,604 Square Feet of Floor Space

Architects: Office of University Architects

Contractors: James I. Barnes Construction Co. — General; Tibbett Plumbing & Heating — Heating & Ventilating; Huffman-Wolfe Co. — Plumbing; Electrical Contractors, Inc. — Electrical.

Aeronautical and Astronautical Research Laboratory

3300 Case Road

Laboratories and offices for:

Department of Aeronautical and Astronautical Engineering

Rocket Laboratory

Aerodynamics Laboratory

Completed 1967 — Cost $853,000

Source of Financial Support:

State Bond Issue for Capital Improvements	$603,000
National Science Foundation	250,000

31,600 Square Feet of Floor Space

Architects: Wright, Gilfillen & Keske

Consulting Engineers: Metzger & Blackburn

Contractors: C. C. Vogel -- General; Lieb-Jackson, Inc. -- Heating & Ventilating; Huffman-Wolfe Co. — Plumbing; S. & S. Electric Co. — Electrical.

Note: The "projects still under construction" in this part of the dedication program of the 12th of May, 1967, were completed as scheduled and occupied by the College of Engineering.

THE FACILITIES dedicated Friday, May 12, 1967 are part of a building program which, including two projects still under construction, will provide $21.0 million, or 840,000 square feet, in new or remodeled facilities for the College of Engineering in less than ten years. Other facilities in this building program, with costs and completion dates, are:

Under Construction:

Electronics and Communications Laboratory 1968 Laboratories, classrooms and administrative offices for Electricial Engineering, including ElectroScience Laboratory, Electronic Materials and Devices Laboratory, Communications & Systems Control Laboratory, Radio Astronomy Laboratory, and Division of Information Sciences	$2,800,000
Systems Engineering Building 1968 Laboratories and classrooms and administrative offices for Industrial Engineering, University Computer and Numerical Computation Laboratory (investment price does not include computer and related equipment)	3,100,000

Buildings Completed:

Chemical Engineering 1959	2,300,000
Civil & Aeronautical Engineering 1960	1,730,000
Electrical Engineering additions 1960, 1964, 1965, 1966, including ElectroScience Laboratory	2,020,000
Building Materials Laboratory 1960	82,000
Water Resources Research Laboratory 1960	183,000
Nuclear Reactor Laboratory 1960	280,000
Robinson Laboratory remodeled 1961 Classrooms, laboratories and administrative offices for Mechanical Engineering and Nuclear Engineering	1,070,000
Radio Observatory	600,000

APPENDIX II

Previous Recipients ☆ of ENGINEERING ALUMNUS AWARDS

Alspaugh, Paul L. ME '28	D Alum '62
Anderson, A. Eugene EE '39	D Alum '68
Bailey, Ervin G. ME '03	Lamme '36
Bain, Edgar C. ChE '12	Lamme '37
Barnebey, Herbert L. ChE '33	D Alum '68
*Barringer, Lawrence G. EM-CER '02	Lamme '40
Bates, Robert L. ChE '48	Texnikoi '66
Behrens, Chester C. EE'26	D Alum '62
Birch, Raymond E. CerE	D Alum '66
*Bleininger, Albert V. ChE '01	Lamme '32
Borntrager, Karl A. CE '16	D Alum '64
Bowser, Phillip C. ME '50	Texnikoi '68
*Boyd, James E. B.Sc. '91	Lamme '38
Boyd, Thomas A. ChE '19	Lamme '39
Boyer, Ralph L. ME '24	Lamme '51
Braidech, Mathew M. ChE '25	Lamme '57
Brandt, Kent H. Arch '51	Texnikoi '64
Breitenstein, August J. EM '26	D Alum '26
*Brooks, Herbert B. ME-EE '03	Lamme '42
Brown, Arthur T. Arch '27	D Alum '60
*Burrell, Col. George A ChE '18	Lamme '35
*Burt, William I. ChE '17	D Alum '55
Cashell, Jack MinE '37	D Alum '63
Chambers, William R. ME '04	Lamme '63
Chope, Henry R. EE '48	D Alum '61
Chope, Wilbert E. EE '48	D Alum '61
	Texnikoi '56
*Chubb, Lewis W. ME-EE '05	Lamme '34
*Clawson, Clinton D. CerE '25	D Alum '56
Coddington, Gilbert H. Arch '31	D Alum '58
Corell, Edwin J. ChE '34	D Alum '64
Cramer, William E. CerE '20	D Alum '60
Critchfield, Robt. M. EE '16	Lamme '56
*Davis, Alton F. ME-EE '14	D Alum '55
Davis, David H. EM '33	D Alum '59
*DeGroote, Melvin ChE '15	Lamme '50
*Diehl, Richard C. MetE '27	D Alum '56
Dunn, Parker S. ChE '30	Lamme '66
Early, James M. EE '48	Texnikoi '67
Farst, James R. ChE '56	Texnikoi '63
Fenburr, Herbert L. ChE '34	D Alum '67
Feorene, Orlando J. IE '43	Texnikoi '61
*Fieldner, Arno C. ChE '06	Lamme '31
Fowler, Wm. A. EPhys '33	Lamme '52
Frankenberg, Theodore T. ME'34	D Alum '57
*French, Thomas E. ME '95	Lamme '43
*Fritz, Howard E. ChE '13	Lamme '49
Garwick, J. Parker AE '30	D Alum '66
Gay, Hayward A. ME '30	Lamme '65
	Texnikoi '55
Gerwick, Ben C. CE '06	D Alum '67
Gossick, Gen. Lee Aero '51	D Alum '60
Graham, John W., Jr. CE '39	D Alum '58
Greene, Raymond P. IE-ME '37	D Alum '63
Habel, O. William ME '23	D Alum '62
*Hall, Ralph E. ChE '11	Lamme '53
Hammerschmidt, Andrew L. EE '38	D Alum '64
Hardgrove, Ralph M. ME'14	Lamme '55
Heimberger, Wm. W. EM '16	Lamme '64
Holaday, Wm. M. ME '25	D Alum '60
Huffman, David A. EE '44	D Alum '65
Huguenard, Cletus M. ME '51	D Alum '59
Jaques, Wm. H. ME '41	D Alum '66
Johnson, James R. CerE '47	Texnikoi '62
Johnson, Hugo E. MetE '40	D Alum '62
Kauer, Theodore J. CE '28	D Alum '65
Keller, Clarence C. EE '29	Lamme '68
Kimberly, A Elliott ME '34	D Alum '63
Kuck, Kermit T. ME '34	D Alum '65
Leas, J. Wesley EE '38	Texnikoi '60
Lee, Harley C. EM '27	Lamme '58
*Lee, Hugh B. EM '12	D Alum '56
LeMay, Gen. Curtis E. CE '32	D Alum '55
Leslie, Wm. C. MetE '47	D Alum '67
Loofbourrow, Alan G. CerE '30	Lamme '60
*Lovejoy, Ellis EM '85	Lamme '37
Masheter, Pearl E. CE '24	D Alum '65
McDougal, Taine G. CerE '11	Lamme '45
McPherson, Donald J. MetE '43	D Alum '58
Meiter, Wm. A. ME '27	D Alum '61
*Mershon, Ralph D. ME'90	Lamme '32
Miehls, George H. CE '17	D Alum '58
*Morrison, Charles S. AgrE '42	D Alum '67

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*Through 1969

Mougey, Harry C. ChE '11	Lamme '41
Newhouse, Russell C. EE '29	D Alum '59
*Ortman, Fred B. CerE '11	D Alum '55
*Park, Charles A. CE '07	Lamme '46
Pierce, James G. IE '55	D Alum '64
Poling, Forrest K. ME '48	Texnikoi '65
Porthouse, Cyril R. ChE '32	D Alum '65
Raney, Estel C. ME-EE '12	Lamme '47
Riddle, Frank H. CerE '31	Lamme '54
Rochte, Col. Lucian S. Aero '53	D Alum '67
Rueckel, Walter C. CerE '29	D Alum '57
Ryder, John D. EE '28	D Alum '57
Sands, Gen. Harry J. ME '38	D Alum '68
Schaefer, J. W. ME '41	D Alum '66
Schiff, Leonard I. EPhys '33	Lamme '59
Schoenlaub, Robt. A. CerE '30	D Alum '64
Schwartzwalder, Karl CerE '30	D Alum '59
Sessions, Robert D. IE '48	Texnikoi '59
Severinghaus, John W. Arch '31	D Alum '63
Seyler, Hobart W. ChE '19	D Alum '59
Sharp, John C. ME '23	D Alum '55
*Shenefield, Samuel L. ChE '18	D Alum '56
Shurtz, Robert F. MinE '37	D Alum '63
Sinclair, George EE '35	D Alum '66
Singer, S. Fred EE '43	D Alum '58
*Skinner, Charles E. ME '90	Lamme '31
Slowter, Edward E. ChE	D Alum '60
Smith, Charles A. CerE '23	Lamme '67
*Smith, Earle C. EM '13	Lamme '48
Stiles, Alvin S. ChE '31	D Alum '62
*Storer, Norman V. ME-EE '91	Lamme '33
Timby, Elmer K. CE '28	D Alum '68
Warner, Harry B. ChE '38	Lamme '62
	Texnikoi '57
*Williams, Harry M. ChE '08	Lamme '44
*Williams, Wm. H. ChE '19	D Alum '57
Woods, Kenneth B. CE '32	D Alum '61
Worcester, Wolsey G. CerE '30	Lamme '61
Wright, John C. EM '49	Texnikoi '58
Yost, L. Morgan Arch '31	D Alum '56

* Deceased

ACE DAY AWARDS 1969

James H. Bassett,B.L.A. 1952	Texnikoi
Robert T. Sawyer,BEE'23,ME'30	Lamme
Maurice F. Garwood,BChE'33	D Alum
Russell G. Glass, BCE'25	D Alum
Dean S. Hubbell,BChE'28, M.S.'28,ChE'39	D Alum
Carl F. Rench,BEE'43	D Alum
Matthew A. Sutton,MS'52,PhD'58	D Alum

Engineering Recipients of Honorary Degrees

THE OHIO STATE UNIVERSITY

Bailey, Ervin George	June 1941
Bain, Edgar Collins	June 1947
Boyd, Thomas Alvin	June 1953
Brumley, Daniel Joseph	June 1934
Burrell, Capt. Glen Smith	June 1942
Davis, Jess Harrison	Dec. 1956
DeGrote, Melvin	June 1955
Everitt, William L.	Dec. 1966
*Fieldner, Arno C.	June 1944
Hoff, G. Preston	June 1964
*Hoover, Charles Potter	June 1949
Humberstone, Joseph Howard	June 1962
*Kettering, Charles Franklin	June 1929
Kusch, Polykarp	June 1959
LeMay, Curtis Emerson	June 1962
*Lincoln, James Finney	June 1950
Lincoln, Paul Martyn	June 1933
*McCaughey, William John	June 1953
*Mershon, Ralph Davenport	June 1936
*Morris, Clyde Tucker	Dec. 1952
Mueller, George E.	June 1965
Pumphrey, Fred Homer	June 1962
Reber, Grote	Aug. 1962
Rickenbacker, Edward Vernon	Aug. 1957
Schwartzwalder, Karl	Dec. 1968
Skinner, Charles Edward	June 1935
*Slayter, Games	June 1963
Smith, Earle Clement	Aug. 1958
Sporn, Philip	June 1957
Thomas, Bertram David	June 1963
Vilella, Roberto Sanchez	Mar. 1966
*Watts, Arthur Simeon	June 1951

The above listed persons will receive special invitations to Centennial Events and their names will be listed in awards programs. They will not be eligible to receive other University awards during the Centennial year.